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PAPERS
IN
COLONIES AND TRADE.

Nº I.
WHITE HERRINGS.

The Sum of FIFTY GUINEAS was this Session presented to Mr. J. F. DENOVA, of Aberdour, Fifeshire, for the continued zeal and success with which he has entered into competition with the Dutch, in the early supply of the Hamburgh Market with PICKLED HERRINGS of very superior quality, thus demonstrating that this very important branch of Commerce is compleatly accessible to British enterprise.

IN the Society's premium list for the Session 1821 and 1822, the gold medal or fifty guineas, is offered for the best sample of white herrings cured in Great Britain or Ireland. For this premium Mr. Denovan who had been rewarded in the

two preceding years for an improved method of curing herrings, and for his successful competition with the Dutch, in the Hamburgh market, became a competitor. His letter on the subject, dated 18th December, 1821, was duly received, as well as a 16 gallon cask of herrings. From the tenor of his letter it did not clearly appear whether he was a candidate for the premium for curing, or for that for exporting cured herrings, and a letter requesting explanation on this head was sent to him by the secretary, on the 21st of the following month. Before the arrival, however, of this letter, Mr. Denovan was gone to prosecute the fishing on the West coast of Scotland, and it did not reach him till the month of May. On the 15th of that month he answered the Secretary's letter, and forwarded a certificate from Messrs. Cordes and Grönemeyer, of Hamburgh, attesting the excellent quality of the herrings forwarded by him to them, for sale in that city. Together with these documents was sent the following essay on the natural history of the herring, and on the herring fishery.

These papers, however, did not arrive in time to be taken into consideration, and to be reported to the Society before the commencement of the vacation. The cask of herrings sent as a sample was therefore not opened, but was placed in the Society's repository, with directions that it should be rolled over from time to time. Notice of this being sent to Mr. Denovan, a letter was received from him on the 28th of the following December, containing a general account of his proceedings during the last fishery, and announcing that he had sent a cask of the present season's herrings to replace that formerly sent, which from its having been kept a year longer than was intended, would probably be found in a bad state.

This second barrel duly arrived, and on the 28th of

February, 1823, the Committee proceeded to examine the contents of the two barrels.

The fish last sent greatly resembled those for which Mr. Denovan was rewarded two years ago. Their scales were quite bright, the flesh was white, perfectly well preserved, but somewhat hard and with but little flavour. Those which were received the year before, and which, from their having been kept on the ground-floor of the Society's house during a very hot summer, were expected to be tainted, presented the following appearance: their scales were not so bright as of the preceding, nor was their flesh so white, it having become of a pale yellowish brown, at the same time it was found to be soft and mellow without being in the least degree flabby, and the flavour was unanimously considered as far superior to that of the recently-pickled fish. Thus, the accident which prevented the investigation of this claim at the regular time, has had the beneficial consequence of showing that Mr. Denovan's herrings may be kept through the second year, under circumstances in several respects not very favourable, not only without receiving any injury, but with a manifest improvement, especially in those characters which constitute the peculiar excellence of the Dutch herrings.

SIR;

HAVING been favoured by a friend with a copy of the printed list, about the middle of December last, and observing that the Society had again offered their gold medal or fifty guineas, for the best sample of white herrings (No. 199), I forwarded to Mr. Vaughan, a sixteen gallon barrel, containing a fair specimen of about one hundred and fifty barrels, cured

by me, on the West coast of Scotland, one hundred and forty-two of which were exported to Hamburgh, in June and July, 1821; but it being impossible to procure certificates from Hamburgh, drawings and other materials illustrative of the subject, in time to be delivered in by the first Tuesday in January following, I resolved to abandon any claim I might otherwise have had to the premium, and to draw up at leisure and present to the Society such a communication on the state of the British herring fishery, as might, I conceived, be worthy their attention and approval.

I had previously determined to write and publish a treatise on the British white-herring fishery, which from the experience I have had, the labour I have taken, and the information I have collected, I felt justified in thinking, would throw more light on the subject than any thing of the kind which had gone before it; but I have deviated from my original plan, and endeavoured to compress the whole into a less shape, which I now offer, with much deference, to the Society, in the form of an essay.

My former communications to the Society contained succinct details of my proceedings during the years 1817, 1818, and 1819; and it will now be necessary by way of introduction, and before entering on other topics, to continue the detail by relating what I have done, and what improvement I may have made since that period.

In the beginning of June, 1820, I proceeded, as on former years, to the West coast; but it was some time before the herrings made their appearance—those that first appeared off the headlands and bays, came in such very small quantities that it was impossible to cure them, some fishermen not being able to obtain more than an hundred or half an hundred within the twenty-four hours; and the boats were, con-

sequently, so much spread, and at such distances from one another, that the herrings were generally sun-struck, which injured the scales so much that I could not attempt to cure them. All herrings which are allowed to lie exposed to the sun, or even to rain, for any length of time before getting salt, appear of a lead colour, and no care or attention afterwards will ever restore the brightness of the scales. They also become extremely soft, and cannot be brought by pickling, to that degree of firmness which is necessary for their preservation; for I have found, by repeated experiments, that they do not discharge, as fresh-caught herrings do, the fixed oil, on being primed, but seem rather to absorb it. Hence it is impossible they can either be well flavoured, or expected to keep for any length of time; and this is, among others, the reason why a great proportion of the herrings cured by coopers and peasants on the North and East coast of Scotland are black at the bone and so very inferior to those of Holland.

Independently of quantity, I also found that the herrings were inferior in quality to those of the preceding year, the greater part being what are called by the Dutch, *Nacht Skaam* or *Sea Sticks*, a species of herring which will not find a market in Hamburgh: on the contrary, if only a few of such fish are admitted into a barrel of sound herrings, they will not bring one-third of the price they would otherways have done.

The appearance of the herrings in general, was poor, and they were more lean and less succulent than I had found them in former years. After a few fine showers, however, they began to improve, and the shoals became larger. It was, however, the 20th of June before I could venture to cure; and on the 27th I had only twenty-eight barrels primed or bung-packed, the contents of which were packed from as great a quantity of herrings as would have filled, at least thirty

barrels ; but this was absolutely necessary from the quantity of sea-sticks and stragglers that appeared in every net. Finding that the canal gates were shut (to admit of some repairs being made on the locks or banks, which are generally performed at Mid-summer), I sent my herrings to Glasgow ; and, in order to save time, had them conveyed to Leith by carts, an expedient which nothing but necessity could warrant ; for the jolting of the carriage and the exposure of the casks to the sun, is extremely injurious to the herrings in many respects ; but I had no choice, for a few days might have enabled my opponents, the Dutch, to reach market before me. On arrival at Leith, I found that the herrings had suffered considerably : two of the barrels had lost nearly all the pickle, while a great proportion of the fish, by rubbing against the ends and sides of the barrels, were not only divested of their scales, but had their skins stripped off as if they had been rasped with a large file. Of the twenty-eight barrels, I could only make up twenty-four that were at all passable, which I shipped by the smack *Albion*, and consigned to the respectable house of Cordes and Grönemeyer, of *Hamburgh*. They left Leith on the 29th of June and reached their destination on the 4th of July, four days before the first Dutch jager, and, with all their imperfections on their head, brought, by public sale, about 3,000 marks banco, netting a profit of about one hundred pounds sterling.

From the proportion of lean and poor fish that continued to appear in the herring shoals up to the middle of July, the small quantity taken, and the great prices that were given by the wherry-men who supply the fresh-fish market at *Glasgow*, I declined curing any more early herrings at that time ; for although the prices behaved to decline in *Hamburgh*, they were still the same here ; and as, by carefully picking the

herrings, I should be forced to reject all the sea-sticks and lean fish, which cost me as much as the sound ones, I saw that no advantage could be gained by making a second exportation to Germany.

Over and above the twenty-eight barrels I also filled a quarter barrel and a few small kegs—the former of these I sent to the king, in uniformity with the Dutch, who always transmit a barrel of the first-cured herrings to their sovereign; I was honoured with a return from sir Benjamin Bloomfield, bart. by command of his majesty, who was graciously pleased to accept of my offering, and “considered the herrings to be of the finest and most delicate flavour.”

Towards the end of August and beginning of September the herrings improved considerably, and I cured betwixt twenty and thirty barrels, which I afterwards packed into kegs for the supply of my agents at Edinburgh and other places: a considerable proportion of this quantity I cured by way of experiment, in the following manner:—

I caused the herrings, after gutting and assorting, to be regularly laid, in half dozens, on a thick plane-tree board, made on purpose, and the heads cut off by means of a knife with two handles, such as is used by tanners and curriers, which operation is easily performed by pressing down the one hand after the other. They were then packed into a barrel in the Dutch manner, that is to say, a little fine Cadiz salt was strewed on the bottom, and the fish laid fairly on their backs with the belly upwards, and so closely wedged together as to prevent them from sliding out of that position; betwixt each layer of herrings *half* the quantity of salt usually employed was carefully strewed with a tin drainer; and when the barrel was packed to within eight inches of the top, a quantity of strained or refined pickle, sufficient to fill the interstices, was

poured in at the top : The lid was then put loosely on ; and in this state they were suffered to remain for three days. On removing the lid the fixed oil was floating on the top, which being removed by means of a brush made with goose-quills (which I have introduced as preferable to the tin skimmer used by the Dutch and British), the pickle appeared much higher in colour than usual, and less slimy. A part of the pickle being then removed, the barrel was fully packed from another cask of the *same night's taking*, and a little salt being strewed on the top it was headed up. The barrel was next cap-sized and put on end, in which position it stood for eight days ; it was then opened as it stood, and as some fixed oil still appeared, a quantity of pickle was poured in to make it rise, when it was wiped off as before ; and the barrel, being packed with an additional layer of the same herrings, was headed up and laid on the *bulge* as being complete.

In my own opinion, these herrings were very superior in point of flavour and softness to the best Dutch herrings cured with heads ; they were much more succulent, and from the whole of the blood-vessels being opened and discharged, would certainly keep much longer than those cured in the common way. But I am sorry to say, that the public were startled at their appearance ; and without giving them a trial, purchased those with heads in preference. I sent a cask of those herrings to the king, in October, 1820, and had a return from sir Benjamin Bloomfield, bart., acquainting me that his majesty was much pleased with my attention ; that the herrings were most excellent : and that the king had been most graciously pleased (as a mark of the royal favour) to appoint me purveyor of herrings to his majesty. I also sent samples of these herrings to several scientific gentlemen of Edinburgh, who expressed their approbation of the improvement ; and were de-

cidedly of opinion, that were our colonial merchants to order their herrings to be cured in this way, they would reap much benefit from the experiment.

In May, 1821, I freighted a very fine fast-sailing cutter, called the General Johnston of Greenock, with which I sailed from that port on the 5th of June following; but owing to the state of the weather (continued gales of wind from W. N. W. and N. N. W. with no rain) I could procure no herrings until the 23rd of that month. I also freighted a large open boat, and had her stationed at the mouth of one of the Highland lochs, where early herrings are frequently found. But all my endeavours to obtain herrings at all fit to be cured proved fruitless until the night of the 23rd of June, when a very few *maatjes* were got amongst a vast quantity of sea-sticks and stragglers. On the night of the 26th, I made up, with much difficulty, 25 barrels sea stock (that is to say, herrings in the priming which require to be afterwards filled up), which I sent on to Leith, where they were reduced to 23 barrels in the making up, and shipped to Hamburgh, on the 30th of June, by the smack Courier. After the first of July, when it began to rain, great bodies of herrings sprung up from the bottom of the deep, like a flock of small birds, with such velocity that the nets appeared to be raised by them above the surface of the water; and as the rain continued to fall they increased in number, and seemed to crowd into all the inlets and bays where the bottom was sandy, or where the points or projections of the coast indicated a profusion of algæ, common fucus, or other marine vegetables. On the 7th of July I sent to Leith 97 barrels sea stock, which were reduced, in filling up, to 89 full-packed barrels, and were shipped to Hamburgh on the 12th by the smack Rhine; and on the 14th I transmitted to Leith 48 barrels sea stock, 30 of which, when made up, were shipped to Hamburgh, by the

smack Glasgow, and the remainder packed into kegs for family use, and sent to my agents at London, Edinburgh, Leith, and other places. Independently of the 25 barrels first cured, I also made up a cask for the King, which was sent off from Leith on the 2nd of July : These herrings gave so much satisfaction, that, as I was informed by a letter from sir Benjamin Bloomfield, bart., they were served up at the coronation-banquet by express command of his majesty.

My first shipment reached Hamburgh on the 5th of July, *five days before the first Dutch jager arrived* ; but I was, nevertheless, sadly disappointed in my expectations. Although my example had failed to rouse the torpid spirit of my own countrymen, it opened the eyes of other nations whose laws are better calculated to support and encourage adventurers in this branch of trade ; for the Fishing Company of Altona, who have about thirty large busses, and the Herring Company of Emden, in Hanover, who have probably more, sent their whole fleets to sea in the month of May. During that month and the greater part of June, it will be recollected that the wind blew incessantly from W. N. W. and N. N. W., and the drought was so great as to be severely felt in every part of the United Kingdom. Several of these busses suffered so severely that they were forced to put back in distress, and the others must, in general, have sustained less or more damage in their sails and rigging. Nevertheless they succeeded in reaching the North coast of Scotland, where they were enabled to fish in smooth water, under the lee of the land. With me the case was very different ; I was on a lee-shore, exposed to all the severity of the weather, where the swell from the Atlantic was so great that it was in general impossible to cast a net with any degree of safety ; while, from the causes which will afterwards be explained, it was altogether improbable that I

could expect to get herrings either in quantity or quality equal to my opponents. The consequence was, that a large buss belonging to the Altona Company arrived at Hamburgh with a cargo of excellent herrings on the 27th of June, the earliest shipment, I am told, that ever was made to that port; while a buss belonging to the Hanoverian Company followed her on the 2nd of July, with another cargo, *eight days* before the Dutch, and *three days* before my first shipment reached that port. Thus the market for early herrings was unfortunately pre-occupied; and retailers and fishmongers, many of whom are individually interested by acting as agents for the Dutch and other foreign busses, having been supplied before the arrival of my parcel, endeavoured by every means in their power to turn the circumstance to the advantage of their constituents. My herrings, as I have observed, were inferior in point of intrinsic quality to any I had ever seen (they were of the small *maatje* species), dry, lean, and not juicy; yet, under all these disadvantages, some of them sold as high as 150 marks Banco per barrel. My second and third shipments were, no doubt, much superior, for the herrings improved daily after it began to rain; but by this time the market for early herrings was fully supplied, and great prices could not be expected. I got about from 2*l.* 10*s.* to 3*l.* 10*s.* for the last of my herrings, but the first Scotch herrings from Caithness, cured in the usual way, with Liverpool salt and unassorted, did not average 25*s.* per barrel.

During the months of July and August, the Dutch, Danes, and Hanoverians, made considerable importations to Hamburgh, and the price of common Scotch salted herrings fell to 16*s.* and 17*s.* per barrel! But this prodigious fall, which has been the ruin of many individuals, was not to be attributed altogether to the importations of foreign-cured

herrings, but to the fallacy of a too generally received opinion, that by *glutting* Hamburgh with an *inferior article*, we shall be able to undersell the Dutch, and force them to abandon the German market !

The quantity of Scotch salted herrings exported to Hamburgh during the last two years was in due proportion with the immense preparations made at all the fishing stations in the country. The consequences, however, have been ruinous ; and although the *extent* of the mischief is not yet known, still the number of bankruptcies that have taken place among our coopers in this part of the United Kingdom, who are generally in the habit of salting great quantities of herrings, without any regard to quality or cure, is truly lamentable. These were in general men of capital and credit, who looked not to such profit as might have been derived from more judicious management, but aimed solely at receiving the government bounty of 4s. per barrel, which is nearly equal to 20 per cent on their advances in the way in which they cure herrings, and which on a few thousand barrels, amounts to a very large sum. But the mischief was not confined to the families and friends of wealthy speculators, it extended itself to a quarter where its operations were severely felt by many a poor industrious individual ; for the masses of Scotch herrings that arrived in Hamburgh in 1820, *after* the market had been supplied by the Dutch, were so great, that no vent could be obtained for them even at *one half* of the intrinsic price ; and many thousand barrels, after lying the whole Winter and Spring in cellars, were foolishly put up *along with the new herrings* as they arrived in 1821, which not only injured the sale of the latter, but excited a strong suspicion that the *new were actually mixed with the old* ; and as this malicious report had no doubt been raised and circulated by the agents for

foreign-cured herrings, at Hamburgh, there is no doubt that it operated its full effect in favour of their constituents. To this, therefore, and not to foreign importations, was the rapid decline in the Hamburgh market to be attributed.

Those, on the other hand, who had cured a few hundred barrels either for the Baltic or Colonial market, were, by holding them, placed in nearly as bad a situation as the exporters. The unfavourable reports of that market not only reduced the selling price at home, but enabled our colonial merchants to purchase herrings at nearly one third less than they cost the unfortunate curers !

It would be idle to say that such mischiefs may not in future be prevented : for as they originate with the legislature, it will only be necessary, I presume, to point out the cause and suggest the remedy. Unequal as I admit myself to be to such a task, yet a sense of duty to my country prompts me to try it. I have had a good deal of experience. I have spared neither pains nor expense to make myself master of the subject ; and as I have no other object in view but the public welfare, I trust that my best endeavours to be useful may, at least, be regarded with indulgence.

I shall first, however, conclude the narrative of my proceedings of last year, with a description of a machine I have tried, and found to be of the most essential service in completing the cure of herrings ; and which, I flatter myself, may greatly tend to their preservation in a tropical climate : and as accounting for the scarcity, the dryness, and the poor condition of the herrings in May and June, 1820 and 1821, on the West coast of Scotland, I shall offer a few remarks on their supposed migration, and the actual food of the herring, which has, until now, puzzled all the writers on natural history.

It has always been, and still is, a matter of the greatest difficulty both with the Dutch and British curers, to clear the pickle of the fixed oil; the Dutch have, no doubt, the advantage, by curing all their herrings on board ship, for the motion of the vessel not only keeps the fish continually covered, but naturally causes the oil to rise more rapidly to the top, when the barrel is put on end. But where herrings are caught in boats on the coast, and cured on shore, the oil often adheres to the fish in rising upwards; and when the barrels are too soon laid on the bulge, which is almost always the case, a great proportion of the herrings are destroyed, especially when they are very closely packed together and laid flatly, instead of being carefully placed on their backs, with the belly upwards. The only method hitherto adopted by the Dutch and British, is to skim off what oil appears on the top, with a round tin plate, as often as may be convenient; and although the Hollanders are much more careful than our own countrymen, in this respect, yet in re-packing on their arrival in Holland, they often find it necessary to throw aside a considerable number that are *rancid in the head*: for one herring affected in this way soon injures the others with which it comes in contact; but as the practice of excluding such herrings forms no part of the British system, even when fish are re-packed for the West-India market, it may easily be figured in what state of perfection they can possibly be, even in the short period of six months from the time of their being first headed up.

In the last paper I had the honour of transmitting to the Society, I particularly detailed the way in which I pickled the gut, gills, and bloody part of the herring. The difficulty I found in clearing this pickle of oil, first suggested the idea of using a brush made of goose quills, instead of a tin plate;

for when the cask was full, I could brush off the oil in an instant with the former, while it required frequent applications of the latter, to clear the top of the barrel even imperfectly ; and as the operation behoved to be repeated at least eight or ten times before the pickle was cleared, I soon found the benefit of the goose-quill brush, for the use of it not only saved much time, but did the thing completely in four repetitions.

Anxious, however, to try the experiment on a new plan, and in such way as might afford definitive proofs of its efficacy, I caused my cooper to make a large iron-bound vat, capable of containing about four hundred gallons, and insert a wooden stop-cock about six inches from the bottom, into which was poured the pickle from the gills, &c., as we collected it ; and in place of simply filling up the barrels of herring, after the priming was completed, I caused the people to pack them into new barrels, and throw the pickle, out of which they were taken, into the large vat, until they made it quite full. It was then stirred round with a pole, and allowed to stand for about an hour, until the top was completely covered with oil ; and this being removed with the brush, the operation being repeated as the oil appeared, the pickle was drawn off gradually by the stop-cock below, and poured into the barrels of re-packed herrings in the most pure and perfect state.

Simple as this invention may appear to be, it will nevertheless be acknowledged by every one who may try it, to be one of the greatest improvements that has been made for many years in the practice of curing herrings. I am sorry it is not in my power to make the experiment on mackarel, as they are seldom taken in sufficient quantity on this coast ; but I am satisfied, that were this method to be adopted *in curing*

mackarel, very great benefit might be expected to result from it.

Before taking leave of this part of the subject, however, I must observe, that during excessive heat in Summer, and when under priming, or even after it, the barrels have been exposed to the noon-day Sun, the pickle of early fat herrings is very apt to become glutinous and ropy; and if not attended to in time, will soon become sour and pungent. When this occurs, the barrels should be immediately removed to a damp cellar, and the herrings taken out. Two pretty close sieves of horse hair (one a little below the other) should be suspended with cords within the mouth of the barrel, and the pickle out of which the fish are taken, gently poured through them for several times; but the sieves must be repeatedly cleared of the slimy matter which adheres to them; and the pickle will then be improved. Before re-packing the herrings, however, they should be carefully washed in a *tub of the pickle*, into which a small quantity of *herring roes* have been previously bruised; and a little fresh salt, finely pounded, should be used in re-packing them, before pouring in the pickle. This treatment will completely remove the evil.

If, on the other hand, the pickle has become inviscated by the introduction of ox-blood, which is sometimes used by herring curers, I know of no method by which it can be restored: this injudicious practice ought to be entirely abolished.

Migration and Food of the Herring.

It is generally believed that after the great shoals of herrings disappear on the east and west coasts of Great Britain,

they retire to some high northern latitude, as they have been observed in great quantities to the north-west of the Shetland Islands, during the Spring months, *as if returning* to their former haunts. But if this hypothesis were correct, they must also have been seen, in their passage to the northern ocean, in the bays of Iceland, or even on the coast of Greenland. Our oldest whalers declare that herrings were never seen on that coast; and on examining the history of Iceland* I find that herrings never formed any part of the fishery of that island. I have also conversed with gentlemen from North Færoe, who assure me that even there herrings were never perceived.

It is observed by all fishermen, that during strong northern or eastern winds the herrings retreat into the deeps; but during mild showery weather and southerly winds they appear in shoaler water and approach the shores; and that in some bays and arms of the sea, they are not only seen but taken during the whole of the Winter and Spring.

Herrings, like all other fishes, are liable to migrations at certain seasons; and, in common with other creatures, have their periods of maturity: they migrate for two reasons, it is said—in quest of food, and for the purpose of propagation. But how these are to be answered in a high northern latitude seems altogether inconsistent with the nature of the fish, for when they make their *first appearance from the deep*, in the early part of Summer, they are without milt and roe, and generally lean and poor; but as the Summer advances they increase in size, the milt and roe become large, they spawn in August and September, and their progeny are seen in

* Island i det Attenaar hundrede. af, C. F. Stephensen, Copenhag. 4to. 1807.

myriads about the headlands, arms of the sea, and bays which they have left.

It is supposed by some naturalists that the herrings return in *one* immense shoal from the Northern Ocean, about the beginning of June. On approaching the isles of Orkney and Shetland they separate, it is said, into three divisions, one of which passes to the eastward of Shetland and through the Pentland frith, and extends itself from Caithness to the coast of Norfolk—another takes its course to the westward of the Hebrides, and along the west coast of Ireland—and the most considerable division passes betwixt Cape Wrath and the Lewis Islands, through the Minch, and enters the several locks, bays, and arms of the sea on the coast of the West Highlands and frith of Clyde, &c. If this supposition was well-founded, the herrings caught on both sides of the island, as forming part of this great shoal, would naturally appear the same in shape, size, and quality ; but so far from this being the case, it will be found that they consist of many distinct tribes and families, all differing in some respect or other and varying in size and appearance. To prove this, it will only be necessary to place a herring, such as I had the honour of transmitting to the Society, on a plate along with a herring which has been caught and cured at the same period, on any part of the east or north-east coast. Not only will they appear to differ materially in shape and in the formation of the fins, but the scales of the east-coast herring will be found to be, at least, one third larger than the other, and perhaps as large again, consequently, the number of scales on the west-coast herrings is considerably greater than on those of the east ; the size of the latter frequently exceeds that of the former, especially at the spawning season. The head and shoulder of the west-coast herring is somewhat similar in shape to the

pilchard, and the quality is so very superior, that in Edinburgh, where both are brought to market in a salted state, when the Caithness, or east-coast herrings, only bring a guinea or twenty-five shillings per barrel, those of Lochfine, or from the west-coast, are readily sold at two guineas.

A shoal of herrings generally makes its appearance off the Loffoden Isles, on the coast of Norway, in the month of July, which passes along, it is supposed, to the southward, where they are taken in immense quantities in the rivers, or rather friths of Drontheim and Bergen, during the whole of the Autumn and Winter. I have seen and examined several samples of these herrings: those taken near the North Cape appear to be of a species entirely different from those met with on any part of the British coast; they contain an immense quantity of fixed oil, are larger by two or three inches than our largest herrings, and in the texture of the fish, and flavour, resemble the gasperoe, a species of herring taken in the river St. John in Nova Scotia. The North-Cape herring differs from all others in the following particulars: the head is shorter in proportion, and more flat and round; the eyes less prominent, the dorsal fin is broader, and the scales are nearly as large as those of the salmon. The herrings, however, taken near Christian Sound in the district of Drontheim, and also in the frith of Bergen, differ materially, both in size and shape, and are of very superior quality. The North-Cape herrings have a harsh disagreeable flavour, while those caught in the frith of Bergen are equal in flavour to our best Caithness herrings, and during the last winter brought as high price in the Baltic ports.

Now, if any credit is to be given to the theory of the herrings coming in one great shoal from a high northern latitude and branching off into several divisions, as they are inter-

cepted in their course southward by the mainland of Scotland, the Hebrides, and the Orkney and Shetland Islands, it may naturally be inferred that the division which is said to pass to the eastward of Shetland, in the beginning of June, should be that which appears off the North Cape in June and July, and along the coast of Norway during the Summer, and as being of the same great family, that there could be nothing in their shape or quality to indicate a difference of species.

Independently, however, of dissimilitude in shape, size, and flavour, there is a striking peculiarity in the natural habits of the Norway Summer herring, which distinctly places the disparity of species beyond all doubt: when the summer herrings make their *first* appearance off *any part* of the coast of Scotland they are small in size, but grow larger as the season advances; whereas, the largest herrings are first seen off the Loffoden Isles in June and July, and the better and less-sized herrings are never caught off Christian Sound, in the frith of Drontheim, or Bergen frith, before the months of August or September,

No sooner do the summer herrings disappear on the Norway coast than they are succeeded by great shoals of Winter herrings, which continue in the friths and bays of that country until the month of April; and the same species of herring is also found on the coast of Jutland, the Elbe and Wezer, and even in the Zúyder Zee.

In the month of November a shoal of herrings enters the frith of Forth in Scotland, and generally remains until the month of March. These herrings appear to be of a similar species to those caught on the coast of Norway, Denmark, and Holland. About twenty-six years ago the fishery in the Forth was carried on to an immense extent, and many thousand barrels of these Winter herrings were salted for the West-

India market. A similar fishing was also carried on at Kessock, near the head of the Murray frith: now, although these herrings appeared at both places about the same time of the year, they differed materially in shape, size, and flavour.

About the same period an extensive herring fishery was carried on at Wingoe Sound, and at other places on the coast Sweden; and the herrings caught there being deemed of a quality better suited to the West-India market than our own Winter herrings, were frequently purchased by British merchants and exported to the colonies. Owing, it is thought, to the number of men of war and other ships that lay in Wingoe Sound during the late war, and the frequent firing of cannon, the herrings that used to frequent that coast in Winter have entirely abandoned it, at least no other reason has hitherto been assigned for their disappearance. As the shoals of Winter herrings are now, however, much more extensive on the coast of Norway (particularly near Fahrund) than they were known to be during the Swedish fishery, it may at least be presumed that the same tribe or family has migrated from the one coast to the other.

Although the same reason will not apply to the fishery in the frith of Forth, yet it is a well-known fact, that since the year 1806 the shoal which annually appeared in that arm of the sea in Winter has gradually decreased and dwindled to nothing, for the whole quantity taken during last Winter did not exceed an hundred barrels. I examined them carefully, both in November, December, and January, and found them to be unfit for curing—they were all carried to market in a fresh state.

When that fishery was at its height, it was generally remarked that the herrings first appeared on the coast of Corn-

wall, in England, mixed with pilchards, where there is a considerable annual fishery of the latter. Their progress along the east coast of England was distinctly traced; great quantities were taken off the coast of Yorkshire and Northumberland a few days previous to their appearance in the frith of Forth; and when the shoal did enter that *frith from the southward*, they were so intermixed with pilchards that they were separated by the curers—the herrings were salted in the usual way, but the pilchards were smoaked. Previous to that period the pilchard was unknown in Scotland, and for the last twelve years none of the species have been seen on our coast.

Some years ago the shoal of Winter herrings in the frith of Forth was succeeded by shoals of a different genus, called by our fishermen garvies; and this was also the case at Kessock in the Murray frith; they appeared frequently in such immense quantities that the peasants laid them on the land for manure. It is generally believed that the sprat is a distinct species of the herring, but I doubt whether the garvie found in the Scotch firths is the same with the *Clupea Sprattus* of Linnæus. Sometimes the garvies appeared before the shoal of Winter herrings in the frith of Forth, and sometimes after them; but it was remarked by all the fishermen, that all the herrings or garvies which were taken in the bay of Inverkeithing, or to the westward, where the water is brackish, were much more lank and less in size than those which were caught at the same period, a few miles to the eastward.

The *Clupea Sprattus* of Linnæus appears in great shoals on the coast of Norway in the months of August and September; they are much less in size than our garvie, and contain more oil. The Norwegians pickle them in small

kegs, and export them under the name of anchovies : they are very neatly put up, and being judiciously spiced, bring a good price in many of the chief towns of Russia, Prussia, and Germany. (I have written to Norway for one of these kegs, and if it arrives in time it shall accompany this paper).

Last year I had an opportunity of examining these Norwegian anchovies, and comparing them with the young Gipsev herrings which are found in immense quantities in this frith during the months of June, July, and August ; and I could not perceive the smallest difference. The largest Norwegian anchovies, and young herrings of equal length, had each forty-four vertebræ, and that roughness of the breast, peculiar to the sprat and which distinguishes it from the young Summer herring, was the same in both. I am thus inclined to think that the sprat is not a distinct species, but merely the Gipsev herring which has been spawned during Winter.

Be this as it may, I intend to try the experiment of curing these young herrings in the Norwegian manner, as soon as I can discover the process employed for this purpose. I see no reason why we may not have British anchovies ; and I flatter myself they would find a ready market in every large city in the kingdom. When I try the experiment I shall send a keg to the Society.

Although it is evident that there are several species of the herring (Linnæus enumerates ten in his *Systema Naturæ*, and there are probably more) and although all these may, in some particulars, differ from one another, still it must be presumed that the aliment on which the whole subsists is the same. Many instances might be adduced of herrings, choosing one place instead of another for their Summer and Winter residence—of appearing there regularly for many seasons, and

of abandoning these haunts, and again revisiting them after a period of years. These desultory habits I attribute to the supply or scarcity of food they find at these places, and the nature of the weather, and temperature of the atmosphere at the time they emerge from the deep.

It is admitted on all hands, that the herrings enter the different bays and arms of the sea which indent both sides of the island, for the purpose of depositing their spawn; indeed, the fact is clearly proved by the myriads of fry which show themselves shortly afterwards in all the little inlets of the rocks where the water is smooth. As this fry is first perceived where the bottom is covered with the alga marina; or, where the rocks which jut out into the sea are clad with the common fucus, or kelp weed, it may naturally be inferred that the spawn is deposited in the gravel under these marine plants, which serve to protect it as well from the convulsions of the ocean, as from being destroyed by other fishes.

If I am right in this hypothesis, it must follow as a natural consequence, that the spawn of the herring on being vivified, draws its subsistence from some attenuated aliment adhering to, or connected with, these marine plants: for it would be inconsistent with the economy of nature to suppose that the herring would deposit its spawn in a situation where the fry could not be supported—but, on the contrary, that it would carefully select those places, where, on emerging from the deep, it had itself found the greatest quantity of food.

It is said that shoals of herrings have been seen on the great bank, several leagues to the North West of Shetland, with their heads to the South East, as if making for the coast; but as no herrings were ever taken to the North West of Shetland, or even of the mainland, it is difficult to say in what state they were, when so seen, or in what state they are in the

month of April, before they appear off the coast ; indeed, their appearance at such a distance from the land may have arisen from some unknown cause, which may not again produce the same effect. But I am satisfied that the herrings *which first appear* either off the East or West coast in the beginning of May (for I have carefully examined them) *are lank and spare* ; but in the course of ten or twelve days become plump and round ; and after the middle of July the milt and roe increase rapidly.

In the months of June and July last, I had many striking proofs of this fact ; and being convinced that the poorness of the herring was owing to the great drought of the season, I resolved to open the stomachs of a number of the fish, and ascertain, if possible, on what they subsisted. In trying the experiment with those that were brought in a boat from some distance, I frequently found nothing, and at other times, a kind of slimy substance ; but, as it occurred to me that this might be owing to the strong digestive powers of the fish, which speedily converts into chyle the food it has swallowed, I saw the necessity of cutting up the fish the moment it was taken from the water : for in man, as well as in animals, the power of the gastric juice is known to continue after death, so as not only to liquify the contents of the stomach, but even to corrode the stomach itself. I therefore pulled with a small boat close in shore, where the rocks were profusely covered with alga and kelp weed, on the one side of a little sandy bay, where the herrings appeared in quantities after a shower, crowding to the surface and leaping at flies ; and throwing over two or three lines with unbated hooks, drew up several full-grown herrings. These were instantly cut up and their stomachs examined ; in some, I found a soft substance, almost like the milt of a herring, which became

somewhat firmer when exposed to the air. In others this substance appeared to be less digested ; and the claws or feelers of small crustacea were, I thought, discernible. I persevered, and found young prawns and shrimps entire, a few of which were so complete that I preserved them in a little herring pickle, and afterwards in a small phial with spirits, which I now send along with this paper. I also found young herrings in the stomachs of many ; but this frequently occurs. Satisfied, however, that the substance I first perceived was different from all these, I continued my exertions for some succeeding days, in the same manner, and still found the same substance most prevalent, but in such a mutilated state that I almost despaired of success ; at length a fisherman having drawn his net, at a very short distance from me, in which was a very large herring, I was fortunate enough to get hold of it immediately ; and on cutting it up, found the stomach actually crammed with the same substance. I spread this out on a board, and on examining it with a glass, was enabled to trace the figure of the animal, for some of the claws were perceptible. But it was greatly under the size of any of that species I had ever seen, and had evidently been swallowed when divested of its shell.

The fish to which I allude is the only species of the *pagurus* or soldier-crab, found in our seas ; it is considered by the vulgar as the young of the common lobster ; but all our fishermen know that it never exceeds six inches in length from the tip of the great claw to the tail. All the species are parasitical, inhabiting the empty cavities of turbinated shells, the animals of which they are supposed to attack and devour, to gain possession of their shell. Like other crustaceous fish they cast their shell ; they also change their habitation with their growth, first occupying the shells of the periwinkle or

trochus, then, perhaps, a nerite as large as a walnut, and after that a whelk. The tail is naked and slender, being covered only with a skin of very delicate texture; but it is furnished at the extremity with two or three hooks, by means of which it secures itself to the shell which it makes choice of. Although this species of the soldier-crab is not noticed by Buffon and many other modern naturalists, it was not unknown to the ancients: Aristotle has very accurately described it under the name *καγκρινιον*. And a favourite old German author thus describes it, "Ein kleiner meerkrab: Ein meerspinnle, wonet in schnek enschalen im meer, inn den schalen et licher labenden schnecken oder muscheln, ein muschelgast." And this description is illustrated by a very accurate engraving.*

I have often heard the most experienced fishers express their astonishment at the comparative small quantity of lobsters and other crustaceous shell-fish, found in our bays, considering the very prolific nature of these creatures. They spawn in the Spring and Autumn; and the quantity they deposit, must, at least, be quadruple to that of any other kind of fish. Of this every person will be convinced on examining the roe of the lobster, of the different species of the crab, and of the shrimp, for in this and other respects, unless it be the disparity of size, there is little difference in their habits. The spawn of the lobster is like a cluster of small peas, which they carry under their tail until it is ripe for exclusion, which generally takes place in May and September, at the former of which periods it is known to change its shell. Although the spawn both of the lobster and crab is deposited at the bottom, it is observed to emerge and float on the surface, in

* Conrad Gesner *Icones Animalium aquatiliū in Mari, &c.* lib. 3. De Crustatis, ordo XIV, p. 209, Heidelberg 1560, fol.

mild, warm, showery weather, where it is vivified by the heat of the Sun : and in small sandy bays and inlets of the sea the fry are perceived in countless myriads. Whenever the heat is succeeded by cold, however, not only does the spawn disappear, but the young shell-fish sink to the bottom, or seek for refuge among the common fucus and alga, which covers the deep shelving of the sub-marine rocks.

In the Lewis and several of the Western Islands, where small shell-fish of every kind is in very great abundance, and which, indeed, about a century ago, constituted a principal part of the food of the inhabitants, it has always been remarked, that when the wind is south or south-west, and showery, great quantities of these creatures are caught at the ebbing of the tide ; but whenever the wind veers round to the northward, they sink into the deep, or burrow in the sand, like sand-eels, while the larger kind disappear entirely. When this happens previous to any change, it is regarded by the inhabitants as a certain indication of northerly wind.

If, therefore, crustaceous animals and their spawn be the food of the herring, which, I think, can hardly be questioned, the scarcity and poorness of the latter, on the West coast of Scotland, during the months of May and June 1821, is well accounted for.

If crustaceous animals be not the food of the herring, how does it happen that, on emerging from the deep, they should flock in shoals to those places *only* where they are to be found—where they deposit their spawn, and where their fry are seen in myriads ?

The lobster is known to change its shell once a year ; and when in a state of nudity, is devoured by the cod, ling, saith, and other large fishes. It may therefore be inferred, that the smaller genera of the crustaceous tribe do the same thing :

or the different soldier-crabs which I found in the stomachs of the herrings, although covered with a kind of skin or integument, had no shell; and thus, while the full grown herrings feed on these and other shell-fish, their progeny are subsisted by the spawn and fry of these creatures with which the water teems, and with which the alga marina and other plants are covered.

As the greatest profusion of lobsters and other shell-fish are found in the bays of Orkney and Shetland, of the Western Islands, and of the Northern points of the mainland, it is no way astonishing that the herrings should, on emerging from the deep when the weather becomes warm, be seen *first* at these places.

Shortly before the lobster fishery commences in Orkney and Shetland, the herrings, it is said, appear in great quantities to the northward of these islands, and also in the Minch, where a singular substance is seen floating on the surface; in all probability the spawn of the lobster, which may be carried in that direction by the tides, and the operation of a southerly wind. In Norway, lobsters are got in great abundance in the neighbourhood of Fahrsund, from whence the spawn may, by the same natural means, extend to the Lofföden Isles and North Cape; but it is remarked, that the herrings generally spawn near Fahrsund, where, at least, their fry are seen in great quantities, and where the shoal of sprats and winter herrings make their first appearance.

A learned and ingenious writer on natural history, in speaking of this floating substance, thus expresses himself: "The different accounts given me by skilful mariners, who were also conversant in the herring-fishery, agreed in this, that the substance consists of separate globules of a *roundish figure*, and of the *size of a pea*, resembles blubber, covers the surface

of the sea to a great extent, and makes it to appear as if covered with oil; that the herrings are known to feed upon it; and that it has been observed in great profusion to the north-west of Shetland, where the herring-shoal existed at the same time. If this account, given me by persons of observation and veracity, is admitted, we need be no longer surprised at the retreat of the herrings to these tracts of the Northern sea, nor at their return in a full-fed and fat condition. The substance here intimated is probably a small species of medusa, or some similar marine animal, which is not as yet known to naturalists."

Although he is incorrect in his idea of the medusa, which is, in fact, the sea-nettle, and is always found of a bright red colour; yet his description of the floating substance corresponds so exactly with the spawn of the lobster, that there cannot, I think, remain a doubt on the subject.

That the flesh of the herring flavours more of shell-fish than any other, is often remarked, particularly if boiled or roasted; and when eaten raw, with vinegaṛ, it is acknowledged to be an excellent substitute for the oyster. This flavour in the herring, however, and even the richness of the herring itself, must depend greatly on the state of the coast where it is taken. If, after feeding on the floating spawn to the northward, the weather be such as to fill the bays and inlets with a profusion of small shell-fish, the herring must improve on entering them. If these creatures, on the contrary, have burrowed in the sand, or sought refuge from the cold among marine plants, the herrings must, necessarily, as I found them in May and June last, be dry and poor. To the immense quantity of small shell-fish that are in general found on the West coast of Scotland, may be attributed the superior quality and flavour of the herrings, and to the many bays and arms of

the sea which indent that part of the coast, where, in smooth water, these shell-fish become a more easy prey to the herring; and which, I think, has the effect of rendering the flesh of those caught in Lochfine and that neighbourhood, more firm and less fibrous than the herrings which are taken off Caithness and the whole of the East coast, where the water is deeper in shore, and where small shell-fish are less abundant.

When the herring fry are observed to leave our bays and lochs, in the beginning of Summer, the shoal moves so very slowly that it would require a period of years to complete their journey to the Frozen Ocean. My opinion is, that they retire into the deep, but at no great distance from the shore, where they remain at the bottom in a kind of torpid state during the Winter, from which situation they are recalled by the Spring and the heat of Summer. Were not this the case, we should see them much earlier than we do with a long prevalence of north or north-west winds, which would naturally facilitate their return from a high northern latitude. But as they invariably make their appearance with a south or south-east wind *much sooner* than when it blows from the opposite point, it is altogether impossible that they could buffet the mountain billows of the ocean, and traverse such an immense extent of sea in the course of a few days.

Of herrings as of all other fishes, I imagine there are many distinct tribes and families, who have each their separate place of resort, both in Winter and Summer; and that their qualities and properties are as different as the places they frequent: for one herring-shoal has frequently been seen to pass another, with much regularity, and without the least commixture. They appear in this respect to be similar to the salmon: like them they form gregarious shoals or associa-

tions, into which only those are admitted who are of the same family. Although the herring seeks no mixture of salt and fresh water, yet they approach the coast for the same purpose that the salmon emerges from the deep : he enters his native river, and the herring his loch or bay, and having answered purposes of nature, both retire again to the deep with the same regularity and order in which they left it.

Epitome of the Statutes of Holland by which their Herring-Fishery is regulated.

Were it not to swell this paper to a great length, I would have given a history of this lucrative branch of trade, marked the periods of its rise and decline, and explained the causes which produced them ; but I shall reserve that branch of the subject for a future purpose, and without going into any long discussion, content myself with drawing a parallel betwixt the laws of Holland and Great Britain, so as to point out their disparity and the glaring errors and absurdities of the latter, which have a tendency not only to check all enterprise and improvement, but to prevent the British fishery from attaining that character and consequence which it ought to possess over that of Holland or any other country.

The Dutch busses and doggers sail from Holland *in a fleet*, early in June, shaping their course for Brassey Sound, in Shetland, under the protection of an armed ship. This vessel was formerly styled in their old statutes an hospital-ship, as the principal duty she has to perform is that of receiving on board such of the fishers as fall sick or meet with any accident during the season ; and her accommodations are such as to afford them every comfort. The fleet is also

accompanied by ten or twelve fast-sailing vessels, called jagers, which run to Holland and Hamburgh with the early herrings during the Jacht-tyd, *i. e.* from the 24th June to the 15th July inclusive; but after that period every buss and dogger must carry home her own cargo, although they are not permitted to enter the ports of Holland before the 19th of that month (in order that all the early herrings may be disposed of at as high a price as possible) unless they have expended their materials, and filled the whole of the barrels they carried out, under a penalty of six thousand guilders: and the whole fleet are prohibited from casting their nets before the 24th of June, or after the 31st of December under the like penalty.

The first jager sails to Vlaardingen, and the second to Hamburgh. The herrings shipped by these vessels are neither bung-packed nor re-packed, but arrive in their original state, or, as it is termed in Scotland, in a green state;* but those sent by the other jagers must, after lying *one night* in pickle, be bung-packed and filled up.

Herrings caught after the Jacht-tyd must lie *ten days* in pickle before they can be branded or sold on arrival in Holland; and to ascertain this the master of each buss is bound to mark between the neck and belly hoop of each barrel, the day on which the herrings were taken, under a penalty of three hundred guilders; and in default of payment confinement on bread and water for a month: The master must also put his own private mark on each barrel under a small penalty.

All herrings caught before sun-rise must be gutted, assorted, and packed before sun-set the same day, or thrown overboard, with the exception after-mentioned.

* Orders voor de Stuurlieden der schepen, begrepen in de Haring Jagerij van Vlaardingen en Maas-sluis.—Rotterdam, 1817, fol.

Those who are employed on board the busses to lay the herrings must put their mark a hand-breadth under the chime ; and also betwixt the neck and belly hoop outside ; and if this is neglected, or, on arrival in Holland the herrings are found to be improperly laid, that is to say, one layer not crossing the other, and packed sideways in place of having the belly upwards, such layers or packers are liable to a penalty of 25 guilders for each barrel.

The mate of every buss or dogger convicted of *Bloemlaagen*, that is to say, picking out the best herrings and packing them in the upper layers of the cask, while the middle is found to contain broken herrings, those bit by sea-dogs, or otherwise unfit for market, subjects himself to the like penalty, and also to corporal punishment, according to circumstances.

The masters are *strictly enjoined* to ASSORT their herrings properly, and to pack each kind by itself in separate barrels ; namely FULL HERRINGS with FULL HERRINGS (*i. e.* full-grown herrings with milt and roe), MAATJES with MAATJES (*i. e.* the early herrings with small milt only), and YLEN with YLEN (*i. e.* a long slender fish) ; and also to keep the HOMZICKEN distinct from the KUITZICKEN (*i. e.* herrings full of milt and roe about to spawn—milt-sick and roe-sick) : On no account must *full* be mixed with *maatjes* or *ylen* ; on the contrary, the masters are bound to draw with their marking knives two gordings or grooves betwixt the neck and belly hoops on each end of the barrels containing *maatjes*, and one serpentine groove or gording round the bulge of the barrel containing *ylen* herring. Masters or mates convicted of offering *mixed* for *assorted* herrings, or falsely marking the barrels, are on the first transgression to be dismissed from their service, and rendered incapable of being again employed, as no sea-brief or passport can again be granted to them for the fishery.

When it happens, however, that towards the close of the season an extraordinary shoal of herrings encircles the buss, and it is found impracticable to assort them all properly, the master is, in that case, permitted to salt the remainder *without assorting* them ; but, on his arrival in Holland, he must, with two of his crew make oath to the fact ; and the herrings so salted shall not only be *specially marked by him*, but shall be *reported inwards* as UNASSORTED or REFUSAL herrings, under which latter denomination only can such herrings be branded by the Keurmeester (inspecting officer of the fishery), or exposed to sale.

The mates are bound to mark all the barrels containing herrings which are cured with *boiled salt* each day as they cure them and before they stow them in the hold in the following manner ;—The *Vrouwtjes haring* with V, *i. e.* herring taken after St. Margaret's day, or from the 21st to the 25th July ; the *Jacobi haring* with J, being taken the day after St. James's day, or from the 26th July to the 24th August ; the *Bartholomei haring* with B as taken the day after St. Bartholomew's day, or from the 25th August to the 14th September ; and the *Kruis haring* with a + or those taken after the 14th September, under the penalty of three guilders for each unmarked barrel. Besides, each mate is bound to appear with two of the crew and make oath before the town-clerk of the port where the vessel arrives, that these herrings were separately marked, as above directed, at sea before they were stowed in the hold.

All buss-masters, after expiry of the *jacht-tyd* (after the 15th July) are prohibited from giving any herrings to jagers, under the penalty of six hundred guilders, dismissal from the fishery, and, according to circumstances, corporal punishment.

And they are under the same penalty restricted from landing and disposing of their herrings in a foreign port *before*

they are brought into Holland, inspected and passed and branded by sworn Keurmeesters, and the proper certificates to that effect granted. Even although forced by stress of weather or during the time of war to enter a foreign port, they are prohibited from selling any unpassed or unbranded herrings, under the same penalty, besides forfeiture of the herrings so disposed of, or at least the value thereof, according to the market price at home.

All buss-masters on obtaining a passport or sea-brief for the herring-fishery are furnished with a copy of the placard or ordonnance regulating that fishery, and must promise, on oath, to perform the various instructions which it contains, before the vessel can be cleared for sea ; and on returning from the fishery they must appear with two of their crew (the two chief officers), and make oath before the town-clerk of the port, not only as to the quantity of herrings they may have taken, but must also produce a regular journal of their proceedings from the day of sailing unto that of their arrival, specifying the *different sorts* of herrings they have on board, and the dates of their several markings ; and should it be discovered that any buss-master has made a false journal, or given a false account of his cargo, he is forthwith prosecuted for perjury and rendered infamous.

All masters and mates are strictly prohibited from rousing herrings (sprinkling them with salt in bulk before gutting them), unless in the case of a great take at the conclusion of the season, when they are permitted to bring them home in *that state* for the purpose of being *smoaked for red herrings* ; or during a severe storm by which the crew are prevented from curing them in terms of the placard : In the former instance, however, they must previously have the greater part or nearly all their cargo stowed ; and the master and two of his crew must, on arrival, account on oath for either occurrence.

All herrings which in the re-packing, whether at sea or after arrival in Holland, require to be heightened (filled up) must only be filled up *with herrings of the same night's taking and assortment*; and no barrels must, on any account, be filled up *with herrings of a later date*, far less with milt-sick, roe-sick, or spent fish: And the sworn Keurmeesters are strictly enjoined to give the fullest effect to this regulation. All barrels which may be broken to fill up others, may be turned over into half barrels or kegs, and branded.

Keurmeesters are directed to pass no unwholesome or ill-cured herrings; but, on the contrary, to cause them to be thrown into the water on being landed; and to levy a fine of six guilders for each barrel.

All the fine salt wrackke (foul) herrings, whether packed in barrels, half barrels, or kegs, shall only be filled up with herrings of *the same take and description*; and must, before they can be exposed to sale be branded thus;—The Jacobi Wrackke, W. J.; the Bartholomei Wrackke, W. B.; and the Kruis Wrackke, W + and that over and above the local brand.

Of coarse salt wrackke, as sea-stock, intended for the Russian market, thirteen barrels shall be packed into twelve; but *shall not be exported to the Elbe or Wezer, under forfeiture of the herrings, and a penalty of one hundred guilders for each barrel besides corporal punishment*. Those sent to Hamburg, Bremen, and the contiguous ports, must be passed, branded, and approved of by Keurmeesters, as perfect in *quality, cure, and assortment*, whether full grown, maatjes, or ylen: *Every twelve barrels* to be packed from *fourteen barrels of sea-stock*, and the barrels bound with sixteen hoops. Herrings of the latter description shall be branded with the *great branding iron*, but those first described (thirteen to twelve) with the date iron; and the ylen herring, whether packed in barrels,

half barrels, or kegs, must be branded *with the words*, “ *Ylen Herring*,” under the penalty of corporal punishment.

Any buss-master convicted of giving showing or lending to any foreigner the printed regulations for the fishery with which he is furnished, for the purpose of instructing such foreigner, shall be adjudged guilty of perjury, forfeit six hundred guilders and be otherways punished.

Of the Salt.

All herrings caught by the busses at sea, may and shall be cured only with Spanish and Portugal salt, and with salt which is boiled from salt within this republic.*

All herrings caught after St. James's or Bartholomew's day shall be cured with salt which has been boiled from salt, pursuant to contract entered into with the city of Cologne.†

No white fine salt shall be received or passed, unless accompanied with a certificate from the maker ; and taking an oath before they use it, that the salt is not changed after receiving it on board, on forfeiture of the salt or the value thereof; and if convicted of perjury to be punished in terms of the said contract with the city of Cologne.‡

All persons are interdicted from using English or French salt for the cure of herrings, whether from Liverpool, Senters, Olderdome, Borcus, St. Martin, Bruarvart, South of France, or Isle de May. All herrings cured with either of these salts are declared unmarketable and shall be confiscated.

All the herrings which are caught after the 24th of June,

* Publicatie van het Uitvoerende Bewind der Bataafsche Republiek, 28 June, 1801, § 28.

† Placaat geresumeerd 23rd May, 1749, § 32.

‡ Ibid, § 29.

whether full, maatjes, or ylen, shall be salted with Spanish or Portugal salt only ; and such herrings shall be called and branded coarse salt herrings : but with salt which is boiled from salt within this republic shall no other herrings be cured, than *prime full grown herrings*, caught *after* the 20th July ; which herrings shall be called and branded fine salt herrings, and of which there are four kinds, namely, Vrouwtje, Jacobi, Bartholomei and Kruis herring, under the penalty of twenty-five guilders per barrel, to be recovered from the mate contravening this section.*

No buss-master, or other person engaged in the fishery, shall be permitted to ship any salt for that purpose, until the same has been inspected and passed by a sworn Keurmeester, thereto appointed by the local authorities of the port or place where the vessel may then be. Should it be discovered that salt of any description has been shipped without such inspection, a fine of six hundred guilders is levied from the ship's husband or owner thereof.

Casks.

All barrels, half barrels, and kegs, of every description, for the herring fishery, shall be made of well-seasoned oak ONLY ; and the staves must be split and not sawed.

Keurmeesters are enjoined to examine strictly all barrels, to reject those that are insufficient or bound with improper hoops ; and to amerce the cooper six stuivers for each rejected barrel.

It is recommended to coopers who make barrels for the herring busses to lay the staves for some time in a steep of moss-water ; and to fire their barrels with turf (peat) only.

* Publicatie van het Uitvoerende Bewind der Batava'sche Republiek, 28 June, 1801, § 28.

Hoops.

Red hoops only shall be used for herring barrels, half barrels and kegs. All barrels, &c. hooped with *export hoops* shall be rejected, as well as those which are bound with unseasoned hoops. No herring barrels shall be bound with a less number of hoops than as before-mentioned, and such hoops shall be placed in terms of the late regulation of the committee of the fishery.

All casks must be branded and passed by the Keurmeester and his assistants before they can be received on board; and although every cooper is bound to brand his own private mark thereon, yet no cooper shall be permitted to brand them for the fishery—the branding iron shall not even be heated in the cooper's premises.

All barrels, half barrels, and kegs, shall be of the contents specified in the regulations, under penalty of seizure.

Sketch, or Outline of the British-Fishery Laws.

A bounty of 3*l.* per ton shall be paid, annually, to the owner or owners of any whole decked buss, or vessel, of not less than 60 tons burden, being British built, owned, navigated and registered according to law, which shall be fitted out for, and actually employed in the deep-sea British white herring fishery; but such bounty shall not be paid on any number of tons more than 100, although the buss should be of greater burden.

A commissioned officer of the British navy is appointed superintendent of the deep-sea fishing, whose duty is to pro-

ceed annually to Brassey Sound in Shetland,—be there on the 15th of June, remain with the vessels employed in that fishery during the season, transmit to the commissioners of the Admiralty, or Fishery-office at Edinburgh, when required, a list of the busses employed, with the number and ages of the men on board of them, distinguishing the capacities in which they respectively act.

Inspectors and other officers appointed by the Treasury to inspect and take account of all herrings landed or exported, and to certify whether the fish are properly salted and packed, *for which purpose* they must have exercised *the trade of a cooper*, and be otherways skilful in this business.

No buss, or vessel entitled to the bounty, unless she have on board *a certain quantity of salt, barrels, netting and men* proportionate to her tonnage, as specified in the act 48, Geo. III.

The owner, or owners, in order to obtain the tonnage bounty, to give notice, in writing, to the officer at the port of outfit, of the name of the buss, the number of men, and the quantity of materials she has on board: and if the officer is satisfied that the regulations have been complied with, he certifies the same on the back of the notice, and one or more of the owners and the master respectively make oath before him, that it is truly their determined purpose that such vessel as then furnished and provided shall forthwith, after license is granted, proceed to Brassey Sound in Shetland, and be there on or before the 22nd day of June (having on board the number of men required) *and shall not wet or shoot her nets before the 24th day of the same month; and shall fish for herrings* in the deep, in the manner practised by the Dutch, that is to say, the nets shall be shot from and hauled into the vessel; and the crew shall cure and pack all the herrings they may take. *The buss shall continue fishing*

from the 24th of June until the 15th September ; and on the owner giving bond, with sufficient sureties that all requisites have been performed, the officer gives the master a licence to proceed on his voyage to the rendezvous.

On arrival at Brassey Sound the superintendant *must search every buss, examine all her nets and stores, and ascertain that she is properly manned.* He then grants a certificate, declaring that the buss is entitled to *commence* the deep-sea fishery for the tonnage bounty.

Herrings taken each day to be distinguished by the date being cut with a knife on the outside of the barrel.

The master of every buss must keep a regular journal, in order to be entitled to claim tonnage bounty.

The officer of the fishery at each port to attend the landing of the herrings, and of the salt and barrels which have not been used, out of each buss, and take account thereof and certify the same ; which officer transmits the master's oath to the commissioners of the fishery, who, if satisfied, give a debenture to the owner, which is payable by the commissioners of excise, or their collector, at the port where the buss has discharged.

Owners of busses to allow their crew two shillings on each barrel of herrings taken and cured by them.

Another species of fishery is permitted to be carried on by vessels not claiming the tonnage bounty. Some of these are fitted out nearly in the same manner as busses, with nets attached to them, which they can shoot from and haul into the vessel. These, although intended to fish in the open sea, confine their operations to lochs and arms of the sea, particularly on the west coast of Scotland, and frequently purchase the herrings they cure from small boats. They are also subject to the control of a superintendant, in the same way as

the deep-sea busses ; but *they are not restricted to time*, and may carry home what quantity of herrings they please, *only they must return to the port from whence they cleared, or to some other port or place* where an officer of the fishery is stationed.

No deep-sea buss, on the other hand, must leave the fishery from the 24th of June until the 15th of September, otherwise she forfeits her tonnage bounty. To this rule, however, there are two exceptions : namely, if she has completed her cargo (400 barrels), in that case she may run into port, and, after discharging, return to the fishery ; or, if forced by stress of weather or loss of her hands to seek a port, she may refit and return to the fishing ; but, in both cases, she *must continue to fish* after the 15th of September until the number of days she was absent are made up.

But the great proportion of these vessels carry only salt and barrels, and purchase the herrings fresh from the fishermen, who take them in small boats around them.

In both cases the owner is bound to give notice to an officer of the fishery of his intention, which officer attends, examines the stores, sees them shipped, and grants a certificate to that effect : articles shipped without such notice liable to confiscation.

Barrels to be marked with the dates, as in the deep-sea fishery, to show whether the herrings have been cured, *gutted or ungutted* ; and whether gutted by *a knife, or with the fingers* ! Masters to keep an account of these particulars, and *of the salt used, the places of curing, quantity put on board every day, and quantity sent into port in any other vessel, or boat*. Such account to be verified on oath before a justice of peace (or fishery officer), and transmitted to such officer, who is to give the master a copy thereof.

Declaration and oath to accompany herrings brought into port in such other vessel, or boat. Herrings and stores to be forfeited if landed before delivery of account, declaration, &c. Commissioners *may waive forfeiture* for errors or omissions not wilful, and *levy a penalty in lieu thereof*.

When salt is kept stored on shore for the purpose of curing such herrings as are caught in small boats, and which, indeed, may be said to be the general method practised in Scotland, notice must be given to an officer of the fishery, an account kept, and marks put on the barrels, as before described. Such herrings cannot be removed, or shipped, or produced for branding, until the curer deliver such account to the officer, and verify it on oath, of which the officer must give him a copy.

All herrings cured in this way, as well as on board of vessels not cleared for the tonnage bounty, if gutted with the knife, and salted and packed within twenty-four hours, are entitled to a bounty of 4s.; *if gutted with the fingers 3s. 6d.*, and, *if ungutted*, 2s. per barrel; in all which cases, however, the barrel, if bung-packed, or re-packed with small (Liverpool) salt, must contain, exclusive of salt and brine, two hundred and thirty-five pounds weight of fish at the least; or, if re-packed with great (Liverpool) salt, for exportation, exclusive of salt and brine, two hundred and twelve pounds weight of fish at least.

All herrings, whether cured in a bounty-buss, or other vessel, or on shore, shall not be branded by any officer of the fishery for bounty, unless a space of time not less than *fifteen days* shall have intervened from and after the day when the herrings were originally cured and packed.

No herrings *roused* or *cured in bulk* shall be branded or allowed to be mixed with herrings cured in barrels.

If herrings cured in bulk are afterwards put into barrels, the barrels must be branded with the word "Bulk" in legible letters.

If the refuse of those which are carried home to be smoked shall be packed in barrels, the barrels must, in like manner, be branded with the word "Refuse."

Every person carrying on the business of a herring curer, before he can receive salt into store, must grant bond to the commissioners of excise, with *two undoubted sureties*, to a very considerable amount; and must make entry of premises for a salt store, which must be open to the inspection of the revenue officers at all times when they find it convenient to call on him; and must, at his own expense, turn out and weigh his salt when required so to do. He must every year give notice (in the Spring) to the excise whether he intends to cure with Liverpool rock, or refined salt; and *he is not permitted, however necessary it may be, to use any other than what he may then name.* He must give a new bond yearly, in the month of May, and cancel the old one.

No other salt is used in the British fishery, either for herrings or white fish, than Liverpool rock and refined salt.

Herrings may be packed in barrels made of *any kind of wood, with the exception of fir*, whether seasoned or not, provided their contents are thirty-two gallons English measure. Herrings may also be packed and branded in half barrels, *but not in kegs.*

Every cooper must brand his own barrels with his name and place of residence: they must also be branded by an excise officer with the letters B F, otherways no credit would be given for the salt; and no bounty can be obtained, until they are again branded by an officer of the fishery. Each barrel must be half an inch thick in the stave.

As to hoops there is no restriction, but Dutch *exportation* hoops are preferred by the coopers. Every barrel must be hooped with sixteen hoops ; but those intended for the colonial market, besides two iron hoops, must be bound at both ends, like a wine-pipe.

Remarks.

In drawing a parallel betwixt the laws of the two countries, the disparity in point of efficiency is too striking to escape observation. The laws of Holland are cautiously and wisely constructed to *improve* and *maintain* the character of their herring-fishery, that inexhaustible mine of wealth to which Holland owes her exalted rank among commercial nations, and her strength and greatness as a naval power, the splendor of her cities arose from the same source, for their historians boast, that Amsterdam itself had its foundation on herring bones. It is many centuries ago since the Dutch established laws for this fishery ; but the principal statute, or placard which was framed during the administration of their great statesman, De Witt, in 1667, with a few trifling amendments, rendered necessary by local occurrences, is the present existing law, by which the Dutch fishery is regulated.

The great extent to which the Dutch prosecuted the herring fishery in De Witt's time induced and stimulated other nations to embark in it ; and various acts were passed by the parliament of Scotland to encourage the inhabitants to fish for, and salt, herrings ; and bounties were given to those who fitted out busses *in imitation of the Dutch*. But, alas ! among all these statutes not one rule or instruction is laid down for ASSORTING, GUTTING, LAYING, or PACKING the herrings, or

the smallest inducement held out to the inhabitants of Scotland to anticipate their opponents either in fishing or reaching the continental market before them. On the contrary, *quantity, and not quality*, as in the present day, appears to have been the object and aim of all our statutes. All kinds of salt, too, whether proper or improper for the cure of herrings, were permitted to be used; indeed, so very ignorant were our ancestors of the nature and advantages of this lucrative branch of trade, that one of the Scotch statutes prohibited herrings from being exported *before Michaelmas*! All herrings caught before that date being ordained to be brought to public market for the supply of the country, in a fresh state.

Whether the Hollanders were the *first* who invented the process of *pickling* herrings has never, I believe, been ascertained; but the Dutch historians ascribe the merit of the discovery to William Beukeling, a native of Biervliet, in Dutch Flanders, who lived about the year 1390.* It is true that the statute 31st Edward III. "regulates the herring fair and fishery of Great Yarmouth, in Norfolk," but we hear nothing of *pickled herrings*. It was common in those days, both in England, Scotland, and Sweden, to throw herrings into vats and barrels with salt, *to preserve them until they could be brought to market* and disposed of; but so ignorant were the inhabitants of Scotland, long after that era, of the pickling process, that a bounty was offered by the Scotch parliament to the Dutch "to fish for and pickle herrings on the

* Anno 1437. Gulielmus Buecklensis sive Bueckelins, industrius et celebris piscator, primus artem invenit harengas saliendo atque in vasis salsamentariis stipandi; mortuus est Bierfietii in Flandria. SCHOCKIUS, Dissertatio de harengis, Groningue 1649, 4to. p. 36—PETIT, Grande Chronique ancienne et moderne de Holland, Zelande, and Dordrecht, 1600, fol. vol. 1, p. 184.

coast of Scotland," in order to stimulate the inhabitants and instruct them in the art.

But it is a fact which cannot be disputed, that Beukeling was the first who *invented and practised the art of gutting*; and that the Dutch found means to conceal that as well as their system of ASSORTING, LAYING, and PACKING their herrings from other nations for about three centuries. So far back as the year 1511 they had keurmeesters and regulations similar to those now in force; and their herring barrels were marked by the curers and branded by the keurmeesters (distinguishing the qualities, assortments, and season when taken) in the same manner as is now practised in Holland; and I strongly suspect that the discovery of the boiled salt for curing their prime herrings (which is at this moment unknown to the British curers) had been made even previous to that period, for I find the following among other regulations for the retailers of herring in Amsterdam: "All herrings which are fished and cured after Bartholomew-day must be branded as such by the sworn keurmeesters, packed fourteen barrels into twelve, in the manner therein directed; the barrels branded with the city arms, and bound (for home use) with fourteen hoops, in terms of the statute 1st September, 1511." *

So early as the year 1471, and during the reign of James III, the Scotch parliament enacted, "That certain lords, spiritual and temporal, and burghs, should gar mak gritt shipps, busses, an ither gritt pink shipps, with netts an ither abuilzements for fishing." This act was confirmed by James IV, in the year 1491; when it was further ordained that no vessel should be employed in the herring-fishery under the burden of twenty tons.

* Domselaar's Beschryving der Stadt Amsterdam, b. iv, p. 257, 4to. Amsterd. 1665.

In 1573 another act was passed for regulating the fishery ; and by the statute of 1584 it was confined to certain towns in Scotland. Another act was passed in 1587 ; and as it is generally supposed that to open and promote any branch of trade to a great extent a company is better adapted than individuals, an act was passed in the first parliament of Charles II, 1661, to encourage the establishment of companies for carrying on the herring-fishery. In 1676 a company of this sort was established at Greenock, but it did not succeed.

In the year 1679 letters patent were granted by Charles II to establish the Company of the Royal Fishery of England. To this company was granted a premium of 20*l.* for every vessel they fitted out on the fishery ; yet their capital of 12,000*l.* was soon expended, and the project abandoned. In 1692 an attempt was made to renew this company with a capital of 300,000*l.*, but King William, it is said, being apprehensive that it might injure the fishery of Holland, rescinded the erection of this company by an act of parliament.

In the year 1705 the Scotch parliament appear to have been sensible that the success of the Dutch, and the preference which they possessed in the continental market was solely owing to their mode of cure, for they not only offered a bounty to the Dutch to fish and cure herrings “ on the coast of Scotland,” but also offered a bounty of 10*s.* 4*d.* Scots, on every last of herrings *exported*, in whatever way they were taken ; and 18*l.* Scots for every last of herrings “ cured like the Dutch in busses.” This was the *first bounty* granted in Great Britain *for the exportation of herrings* ; and the Scotch parliament very properly, in imitation of the Dutch, *remitted the duties on all materials used in the fishery, and removed all restrictions of customs and excise* with which that branch of trade then was, and now is fettered.

For several years previous to the Union, the Scotch fishery, *even when no bounty was paid*, increased considerably, and the exportations from Scotland were immense; but the price obtained for Scotch cured herrings was so much below the price at which Dutch herrings were sold, that the government held out an inducement to the Dutch to fish in concert with our countrymen, so as they might acquire their superior mode of cure. The Scotch fishery was at this period at its height, and had the laudable intentions of the parliament been carried into effect, it may be questioned whether we should not, in a short time, have rivalled the Dutch.

After the Union, however, the fishery ceased, and in spite of all the props and supports which it received, has continued to decline. In 1720 a kind of general copartnery was formed for the purpose of reviving the fishery; it consisted of about 2,300 of the principal people in Scotland, and their capital was divided into shares of 100*l.* each, but it soon fell to the ground.

In 1727 the board of trustees was established at Edinburgh, to whom the management of 2,000*l.* per annum was given from the revenue of Scotland, for the encouragement of the manufactures and fisheries of Scotland; and although the trustees do occasionally give trifling bounties to persons concerned in the linen trade, and in the cod and ling fishery, I never heard of any thing being either given or offered to be given by them for the improvement or encouragement of the herring-fishery.

In 1750 the free British White Herring Company was established by act of parliament, permitting a capital of 500,000*l.* to be subscribed, and the proprietors to receive 3 per cent per annum upon the advances made during fourteen years. A bounty of thirty shillings per ton was also allowed

on all busses employed by the company of from 20 to 80 tons burden. Although this national institution was supported by many of the most spirited and wealthy noblemen, it soon vanished into air.

This act also declared that every fishing company at any port in Britain having a capital of 10,000*l.* should be entitled to the same premium of 3 per cent, and to the bounty of 30 shillings per ton; but these terms were never accepted of. Three other acts of parliament were passed in the years 1753, 1755, and 1756, exclusively regulating the buss fishery, but the trade continued to decline.

In 1757, another act was passed whereby the buss bounty was increased from 30 to 40 shillings per ton; and so many individuals were allured by the bait, that not less than 22,296*l.* was paid in England, in 1771, of tonnage bounty; and during the year 1767, no less than 31,396*l.* in Scotland. But as the adventurers were no gainers by the attempt, the bounty was, in 1771, again reduced to 30 shillings, the number of busses was abridged; and in 1782, although a very few were fitted out in Scotland, not one left England.

In 1779, another act was passed, followed by an interim one, by which the herring-fishery continued to be regulated, until the Highland Society of Scotland interfered; and by their influence and patriotic exertions, the act which now regulates the fishery, and of which, with its amendments, I have given an outline, was, in 1808, passed into a law. Great expectations were entertained from the high premium of 3*l.* per ton, and other illusive advantages which this new law offered; and several individuals were induced to embark in the fishing. But year after year brought fresh proofs of its fallacy—the adventurers lost money—the number of busses rapidly declined; in 1820, only two busses started from

England, and one from Scotland ; and the deep-sea herring fishery of Great Britain died without a struggle ! Although no public notice has been taken of this event, yet, as it were to cover the disgrace, for the failure of such a grand national object must naturally entail disgrace on those who framed and supported such a bill, the commissioners for the fishery have quietly obtained an act of parliament, repealing the tonnage-bounty on deep-sea busses.

Thus, notwithstanding the numerous laws before recited—
notwithstanding the various attempts, and the money that has been expended by the country, in bounties for the establishment of the herring-fishery, this great national object—this source of wealth, of industry and trade, still remains chiefly in the hands of a foreign, a rival, and a remote nation ; nor have the subjects of Great Britain ever been instructed how to avail themselves of the bounties of Providence—of the treasures which their own shores so abundantly afford ! As a learned writer observes, “ Is our herring-fishery to be resigned for ever to foreigners ?—Is Britain, from its present state, unable to prosecute, with advantage, this great national object ?—Or, are the laws hitherto enacted on the subject so perfect as to admit of no further improvement ? It would be deplorable, indeed, was either the public or the legislature to acquiesce in these sentiments ; or, to presume from the failure of past attempts, that no other can be made with success.”*

* Professor Walker's Essay on the Natural History of the Herring, 3vo. Edinb. 1796.

Causes of the failure of the Scotch and British Fisheries.

It is admitted, on all hands, that the Dutch were the first who carried on the herring-fishery as a branch of trade, and the success which attended their endeavours induced the Scotch, and other nations, to follow their example. But the operations of both English and Scotch were at first confined to the supply of their own markets; while the Dutch, after carrying their herrings to Holland, exported them to other countries. Finding this to be a very lucrative branch of commerce, they increased the number of their busses yearly; and as they had no opponents, the trade was exclusively in their hands; and they supplied the whole of Europe with pickled herrings of their own curing. So early as the year 1614, the Dutch exported 74,000 lasts of herrings, which were estimated at 1,517,000*l.*; the price being then between 20 and 30*l.* per last. It is stated in De Witt's *Interest of Holland*,* that in the year 1667, his countrymen fished with no less than 2,000 busses; and that, at least 800,000 people in the provinces of Holland and West Friesland, were employed in, and supported by, the fishery. When, therefore, the Scotch embarked seriously in the undertaking, with the view of exporting their herrings, they laboured under the same disadvantages which the inhabitants of Great Britain do at this moment:—the Dutch held a precedency and a preference in the foreign market—they had a numerous fleet at sea; and their herrings were cured in a manner far superior to that of their opponents. The Scotch parliament were vain enough to cause busses to be fitted out *in imitation of the Dutch*; but

* *Het algemeen Belang der Vereenigde Nederlanden*, p. 307, 410. Amsterd. 1672.

restricted the inhabitants from exporting their herrings until after Michaelmas! by which time the Dutch had supplied the foreign market with a superior article. The busses that were so fitted out, were small, ill-found vessels, poorly manned, and destitute of that accommodation and convenience which is so necessary for the *assorting, pickling, laying, and packing* of herrings in the open sea; for these operations cannot be performed with any degree of propriety or accuracy in a small vessel; and these busses were, as in the present day, *forced to meet at a distant rendezvous.*

According to the present statute, all busses must, as I have shown, *be at Brassey Sound, in Shetland on or before the 22nd of June*, where, if they were numerous, the examination of their nets and other appurtenances by the superintendent, would necessarily *occupy not only days but weeks.* Such of these vessels as belonged to Glasgow, Greenock, or other commercial towns in the West of Scotland, would have to perform a longer voyage to this rendezvous, than even the Dutch Germans, or Danes; and although in their way through the Minch, or round the headlands, they fell in with a shoal of the finest herrings, *they must steer through them, without wetting a net!* And those from the coast of Norfolk, or east coast of Scotland, although the journey is shorter, would, under similar circumstances, fare no better. When the buss has passed in review before the superintendent, she proceeds to fish—*she must complete her cargo, or remain three months at sea to do it!*—So that, if in the *first week* she procured *nine-tenths of it*, she would be obliged to keep the sea for *eleven weeks for the other tenth*, or forfeit the bounty! If, as I shall suppose, she began to fish *with the Dutch* on the 24th of June, was successful, got the *FIRST herrings*, *cured them as well, and was permitted, by law, to carry them*

to a foreign port, she might get from 12*l.* to 17*l.* a barrel; but if she kept the sea for three months, cured her herrings in the Scotch way, and sent them to Germany, she would, as was actually the case in Oct. 1820, get 17*s.* a barrel for them.

A herring buss of sixty tons burden, with her nets and materials could not be freighted for less than 60*l.* per month; and allowing that she completed her cargo of 400 barrels in three months, the time prescribed by the statute, what gainer could the freighter be, even allowing that in place of 17*s.* he got 20*s.* a barrel for his herrings, and the government bounty of 3*l.* per ton?—This I conceive to be a fair hypothesis, and I shall try the thing in figures.

400 barrels of herrings, @ 20 <i>s.</i>	£.400 0 0
Government bounty, @ 3 <i>l.</i> per ton	180 0 0
	<hr/>
	£.580 0 0
Freight of the buss for three months, @ 60 <i>l.</i>	180 0 0
2 <i>s.</i> per barrel to the crew, in terms of the act	40 0 0
400 oak barrels, @ 6 <i>s.</i>	120 0 0
800 bushels Liverpool salt. @ 1 <i>s.</i> 6 <i>d.</i> ...	60 0 0
	<hr/>
	400 0 0
Balance in favour of the buss	£.180 0 0

After deducting, however, from this sum the expense of provisions, men's wages, insurance, port-charges, landing, storing, re-shipping, and freight of the herrings to the continent, it will be found that the adventurer has nothing to himself.

In 1820, by the printed report of the commissioners at Edinburgh, one buss sailed from Campbel-town, and two from Great Yarmouth, which vessels altogether took and cured in three months 629½ barrels, the selling price of which was, at Leith, on their return from the fishing, 17s. £.535 1 6

Tonnage bounty paid (per said report) on the			
three	554	0	0
	<hr/>		
	£.1,089	1	6

Deductions:—

Freight of the 3 busses, @ 60l. ...	£.540	0	0
2s. per barrel to the crew	62	19	0
629½ oak barrels, at 6s.	188	16	0
Say 1,000 bushels Liverpool salt,			
@ 1s. 6d.	75	0	0
	<hr/>		
	866	15	0

To be divided among the *three* busses ... £.222 6 6

and which would not, in fact, pay the men's wages, provisions, port-charges, and other expenses.

But it must not be forgotten that besides the formalities of the fishery law, the freighter or proprietor of a buss has to run the gauntlet through a horde of custom-house and excise officers, both at clearing and returning to port, who generally lose no opportunity of seizing his salt or otherways molesting him, when it happens that through ignorance or inadvertency, some trifling punctilio of the law has been omitted. He has troubles and formalities not a few to get through before he can effectuate the payment of his bounty; and should it so fall out that he has only got one half, or one-third of his cargo, and has suffered severely by his adventure, he must also suffer the same trouble and go through the same formalities as those who have got a full cargo.

It has always been the aim of the British government to imitate the Dutch in their fishing; and the aim was laudable, had our fishers known their system, been enabled to follow their other movements, and to cope with them *in point of numbers*; but the original was neither to be equalled nor surpassed by a spurious copy: we have all along been as great strangers to their policy as to their mode of cure; we never studied the one or learned the other. The Dutch live at a distance of nearly 700 miles from the Shetland Isles, yet *the nature of their fishery* left them no alternative: it was necessary for their numerous fleet to congregate at or near a place where, *at a certain time, the herrings were known to emerge from the deep*, and from whence they had *the shortest run* to Germany and Holland. To prevent other nations from anticipating them in their preliminary movements, which would have been fatal to their undertaking, they availed themselves of the superstition of the 15th and 16th centuries: they were quite aware that herrings could be got at an earlier period around the coast of Scotland, particularly on the west coast, but as it would be both inconvenient *for their vessels*, and attended with much expense, to enter our bays and harbours in the Spring months to wait their coming, they, as it were, forced on the world a belief that herrings were not at maturity, or in a fit state for curing, before the 24th of June (the festival of St. John), and the better to deceive their contemporaries, they prohibited their fishers from wetting their nets before that night.

But their chief motive for congregating at a given point, was not only to begin the fishing at one and the same time, but to enable the *wachters* as they were then called, or the *jagers* as they are now called, *to collect and carry off from the fleet such a quantity of rich early herrings* as would supply

their own and the German market before the Scotch or any other nation; with a few ill-manned vessels, could possibly precede them.

Our ancestors *were even ignorant of the use of these wachters*; for in the year 1633, when Mr. Smith was sent by the earl of Pembroke to Shetland, in order to make inquiries concerning the Dutch fishery, he reported that in that year the Dutch had 1,500 busses of about 80 tons, 400 doggers of about 60 tons; “and 20 waffters or wachters, as they were called; *which were armed vessels for the protection of the fishery.*”*

But why should the British be restricted to a day? Why should they seek Brassey Sound or any other remote rendezvous, when the *earliest* and the *best* herrings are to be found in the Minch, in Thurso Bay, and at many other points of the main land, from the near neighbourhood of which places the gross of our busses sail? Could a project so inexpedient, and regulated by statutes so inapplicable and inconsistent ever be expected to thrive? This palpable blunder has been the very bane of the Scotch as well as of the British deep-sea fishery; and it is, beyond measure astonishing that the Scotch and British legislators should have persisted in an error so glaring for the space of 350 years, that is from the year 1471 to the year 1821.

But as our deep-sea fishing is for the present at an end, I shall offer a few remarks on the coast fishery of Scotland, and the manner in which it is conducted.

This species of fishing is either carried on in vessels furnished with salt and barrels, the crews of which purchase herrings from the fishermen, who take them in small boats,

* England's Improvement Revived, by John Smith, London, 1673; 4to. p. 250.

and bring them on board to be salted ; or the herrings are carried on shore by the small boats, and cured in cellars, or more frequently *in the open air without any covering* ; but the mode of curing in both ways is the same ; and a bounty of 4s. per barrel is paid by the excise, under certain conditions mentioned in the statute.

The slovenly manner in which herrings are cured, both on board these vessels and on shore, is really too disgusting to be minutely described : but the coopers and peasants engaged in that trade look only to *quantity—quality and improvement* are as foreign to their purpose as they are to our laws.

Towards the end of June the wealthiest of our coopers about Leith and the neighbourhood (for poor men can neither find money to advance, nor sureties to subscribe, salt bonds) engage all the fishing-boats and their crews that are to be had at Newhaven and the other contiguous fishing villages. These boats proceed to Wick, or other stations in Caithness, about *the middle of July*, which they reach *about the time that the Dutch have supplied their own and the German market*. The coopers then send down small vessels loaded with salt and barrels, and *the fishing commences*. Should it so happen, as is generally the case, that a shoal is on the coast, the herrings are brought on shore in masses, and thrown like rubbish on the ground into small uncovered booths, which are formed by slabs or planks raised about three feet from the surface : In this booth several boys or girls are placed, wading among the herrings knee-deep, gutting them, some with knives and others with their fingers. They are then thrown into a basket, and packed *on their sides* in a barrel. *All sorts and denominations are huddled together without discrimination* ; and *Liverpool salt only* is used both in priming and completing the cure. To ensure the payment of the bounty the herrings are frequently

pressed down with a round wooden board while the barrel is re-packing, which operation is performed by a man standing and jumping on it with his feet ; and if *plenty of salt* is added, and the barrel is thought to contain *the weight* required by the fishery-act, the cure is completed. This operation, however, as the herrings have then neared the shore to spawn, has frequently the effect of *squeezing out the large milt and roe*, which gives them a disgusting appearance. This is all that is looked to ; for if a man can manage to make up one or two thousand barrels in this way, should he get no more than the barrel bounty he is sufficiently remunerated in his own opinion. This is the general practice : some coopers, indeed, are much more attentive and bestow more pains than others in putting up herrings ; but although they are all equally ignorant of the Dutch mode of cure, or even of the materials, they confidently assure the purchaser, that they cure herrings as well as the Dutch in their busses !

When the coopers have expended all their materials, they are succeeded by the peasants, who could not otherways be supplied. These purchase the herrings at a much lower price than the rate at which the coopers engaged the boats, and the salting of herrings is carried on in a still more slovenly manner than before, until the shoal leaves the coast.

The eagerness of the wealthier coopers to procure *great* quantities of herrings often gives place to a kind of competition with the fishermen, and rather than be disappointed I have known them engage to give fourteen or fifteen shillings for *the same measure of fresh herrings*, which they afterwards sold at seventeen shillings *in a cured state, salt and barrel included*. Indeed the engaging of fisher boats in this way previous to the commencement of the fishing has been productive of the most serious evils ; for independently of the high rate offered

to the fishermen, the coopers also furnish them with a certain quantity of spirits daily—they must freight a vessel to carry their salt and barrels to the North, and another to bring their salted herrings to the South ; and they have their own private expenses to bear, and the shipping, landing, port charges, and other dues, to defray.

Many extensive bankruptcies have, in consequence, taken place among these people, within the last two years particularly ; and the deluded fishermen, instead of profiting by the high rate at which they were engaged, have been paid with a trifling composition of four or five shillings per pound sterling.

Formerly, when there was no such bounty, and when these fishermen received a moderate price, say five or six shillings per kran (the measure of fresh fish equal to a barrel) they were frugal, sober, and religious ; they built boats and houses and were free of debt : but for some years back, the advance they received instead of benefiting their families has introduced extravagance dissipation and vice. Their earnings were soon spent, and they contracted debts which they could only engage to discharge at the conclusion of the ensuing fishing.

As I have before observed, every fish-curer, of whatever denomination, must execute a bond with *two* sufficient sureties to the excise, to a very great amount ; and must not only enter the premises where he keeps his salt, but they must be at all times open to the inspection of the revenue officers. This restriction is sufficient of itself to curb and prevent industrious poverty from making an effort ; but should it so happen that a plodding ingenious individual overcomes this difficulty by finding at his native place two friends to subscribe his bond, it would avail him little, for should he ship his salt in a vessel for the North, for the purpose of curing herrings at Wick or any other place, *he must before he can land a bushel of his salt*

execute another bond with two new sureties resident at that port ; for should he land and place his salt in a cellar without doing so, it would be immediately seized by the revenue officers, and he would be subjected to an Exchequer prosecution !

By the operation of this law the coast fishery of Scotland is placed in the hands of, and monopolised by, wealthy individuals, to the exclusion of the poorer classes, who, if they found means to overcome these difficulties are prevented from obtaining herrings by a previous engagement of the boats by their wealthy opponents at a rate far above their ability to advance.

Although this abuse of our fishery has been the ruin of many wealthy and respectable men, it does not seem to deter others from following the same mad scheme, and the interposition of the legislature is imperiously called for to check its further progress.

If any of these curers, on the other hand, were desirous of curing their herrings on an improved plan at these fishing stations, where they are brought on shore in such vast quantities, I apprehend that two leading sections of our Fishery-act would go a great way to frustrate their intentions. It is directed that all fresh herrings delivered by the fishermen to the coopers shall be measured with a kran, a barrel somewhat larger than the common herring barrel, bound with iron hoops, open at both ends, and branded in a particular manner ; and that the *cured herrings* shall be of *a certain weight* as before stated. When the herrings, therefore, are brought on shore, they are cast with baskets into this kran, and on its being removed are thrown up like manure with spades and shovels into heaps, and thence in smaller quantities into the booths for packing. In this operation, their preservation and beauty, of which the Dutch are so extremely tenacious, are not only destroyed, but the scales themselves are completely rubbed off ;

while the second operation of weighing, which is performed by tumbling the herrings from their original package into an empty barrel which has been previously weighed, completes this ridiculous and unnecessary work of destruction.

Sometimes, too, and that not unfrequently, when the herrings are brought home, the revenue officers on a suspicion that contraband goods might be packed among them, are permitted to satisfy their curiosity by running an iron rod or spit in different directions from the top to the bottom of the barrel.

These are what may be termed legal obstacles to improvement, to which every person concerned in the coast fishery is subjected; and which have their full effect in lessening the value of our herrings in a foreign market; but there is an abuse committed by the curers themselves which is extremely hurtful to the exporter; namely, that of packing the top and bottom with a few layers of good herrings to deceive the purchaser, and filling the middle of the barrel with small, broken, and other unsaleable herrings. This is what the Dutch call "*bloemlaagen*," a crime which subjects the offender to corporal punishment, the master of the buss to a fine of twenty-five guilders a barrel, and the fish so packed to confiscation.

It frequently happens that parcels of herrings are returned to the seller, in Hamburgh and other foreign ports, when the purchaser discovers this fraud; for the law as to the sale of herrings, which is the same as in Holland, entitles him to do so.

I feel it unnecessary to make any farther remark as to vessels which carry nets for the purpose of fishing in the open sea, but to whom no buss-bounty is paid, as they do not conform to the regulations laid down for the deep-sea fishing, than that their operations are chiefly confined to the lochs in

the Minch and in the West Highlands. They sometimes fish with their nets, but more frequently purchase fish from the small boats as they find most convenient, so that these vessels are rather to be considered as magazines for holding materials than as open sea busses. It is however a gross mistake, to suppose that this species of fishery is a nursery for seamen—nothing can be more unfounded. There is seldom an apprentice on board of these vessels or any person fit to serve in the navy. The masters are, for the most part, coopers, and the only seamen who are engaged to manage the vessel are poor broken-down creatures who cannot find employment elsewhere. The rest of the crew are highlanders or mechanics casually picked up, who when the fishing terminates return to their usual avocations, and do not go again to sea until the next fishing season. I must, however, do the crews of these vessels the justice to say, that with the exception of the *Yarmouth deep-sea busses*, more care and attention is bestowed on the cure of herrings by them, than by any other individuals concerned in the British fishery. The herrings on the West coast, as I have before observed, are far superior to those taken off any other part of Scotland. They are much higher in price, are generally cured for home consumption, and are seldom exported to the continent.

On reverting however to the Dutch laws and their mode of cure, it will appear, that *all our herrings*, whether cured in busses or on shore, can only claim the character of UNASSORTED or MIXED HERRINGS in the continental market; and even were they put up with more attention than they generally are, cannot be expected to command a *higher price* than that at which *Dutch herrings of the same class* are sold. This is a fatal truth which cannot be too strongly impressed on the notice of the legislature; for this, added to the improper use

of *Liverpool salt*, at all seasons, and for all kinds of *herring*, must effectually prevent them from rising in price, or remunerating the importer in the German market.

*Hints and Suggestions for the Improvement of the British
Herring-Fishery.*

When the late Mr. George Rose was employed in framing the act which with some few amendments now regulates the British fishery, he was unfortunately guided in his movements by revenue officers only, who, in turn, drew and collected information from such of the most wealthy Scotch coopers as had long been engaged in salting great quantities of herrings in the manner now practised in the coast fishery. Thus every possible care was taken to preserve entire the spirit and severity of the salt laws, and to confine the fishery to great capitalists; but no attempt whatever was made *to improve the mode of cure—to discover or inquire into* the system of Holland, or to encourage individuals to compete with the Dutch in a foreign market. When this act made its appearance the public were taught to believe, that it was nearly a transcript of the laws of Holland, and that on that account the greatest national advantage might be expected to result from its operation; but years and experience have proved the fallacy of this opinion.

A learned writer on the Herring-Fishery observes, “That towards the end of the 16th century, the Scotch, in the exportation of herrings, became in some degree rivals to the Dutch. During many years before the Union, the herring-fishery was a flourishing and beneficial business in Scotland, but was at that era annihilated, and has never since been re-

covered. It was then all carried on upon the coast in open boats and *without any bounty* ; but the Scotch parliament, in imitation of the Dutch, very properly remitted the duties and exactions payable on all materials used in the fishery, and it was a more gainful trade both to individuals and to the nation, than it is at present with all the bounties and premiums given by the public.

“ The cause of this unfortunate alteration in the state of the Scotch fisheries may be easily traced. Previous to the Union they formed the principal branch of commerce in the kingdom ; they were therefore carefully protected by the legislature, and many salutary laws were enacted from time to time by the Scots parliament for their encouragement ; particularly, all the people in Scotland engaged in the fishery had *easy access to salt of good quality, free of all impost, at the cheapest rate, and in the most unconfined manner*, without which it is impossible any fisheries can flourish. After the Union, the enactment of the salt duties and the complicated regulations established for their management, the difficulties in obtaining salt, and the *great risk* incurred by traders entering into salt bonds, at once depressed the fisheries of Scotland, which for long had worn the most promising appearance.”

To these causes, therefore, to the *increased severity* of the revenue laws, to our injudicious imitation of the Dutch busses without studying either the policy or system of the Dutch, and to the payment of bounties *on quantities of unassorted herrings*, cured in the wane of the German market, may be justly attributed the failure of the deep-sea fishing, the decline of the coast fishery, and the ruinous consequences which have resulted to individuals.

To improve and establish the herring-fishery of Great Britain upon a sure and solid basis, and such as I flatter my-

self would render it a branch of trade, at once lucrative and advantageous to individuals and to the nation at large, I would humbly propose and suggest:

That it should be lawful for any subject of Great Britain or Ireland to fit out a buss in the manner of the Dutch, *to fish with nets*, from any part of the United Kingdom; and send her *to such a latitude, or to such a point as he might think most suitable to his purpose*. Such buss to be manned with a sufficient number of *thorough-bred seamen and apprentices*, one or two coopers, for heading and repairing the barrels, and in the option of the owner or freighter such a number of Dutch fishers, as he might think proper to engage for the purpose of instructing his crew in the branches of assorting, gutting, laying and packing the herrings. The owner or freighter to be under no restriction as to the quantity of netting, provided the meshes be of such dimensions as not to injure the fry or young herrings: Neither should he be restricted as to the quantity of barrels or salt, but allowed to act, in this respect as his circumstances and ability might warrant; but no buss, *on the herring-fishery only*, to be allowed to clear or leave port before the first of May in any one year.

The owner or master of every buss to be obliged to brand his barrels with his own particular brand before leaving port, and subject them to the inspection of the clearing officer, who if unacquainted with that trade, or doubtful of their sufficiency, should be authorised to call a survey by two coopers resident at the port, by whose decision he may suffer them to be shipped, or reject those that are defective. It might be injudicious *at first* to prohibit the use of ash, willow, or beech barrels, but it would be proper to recommend strongly to all persons concerned in the *early herring fishery*, and indeed in

every branch of it, to use only oak barrels ; for to *all other wood, except oak*, does the fixed oil of the herrings adhere, nay, I have often remarked, that in birch barrels where there were many knots, the fixed oil was at first imbibed, and afterwards exudated, which made the herrings at the sides of the barrels that came in contact with it become rancid.

Every buss-master should be obliged to weigh over his salt in presence of the excise or other revenue officer, who should be empowered to cause the same to be surveyed by a chemist, to ascertain whether it be of a *quality and condition* fit to be used for curing herrings before he allows it to be shipped. The master and owner to give bond to the proper officer of the port for the due application of the salt, under a certain penalty, *but no sureties to be required*.

Every buss-master previous to fitting out for the fishery to be furnished with a printed schedule from the collector or other officer at the port where he resides, or from which he must clear, *containing all the regulations and instructions* necessary to be known, and as practised by the Dutch, so as he may follow their system implicitly ; and he should make oath, with two of his crew, and promise to implement the same to the best of his power so as to entitle him to the bounty after-mentioned.

That a bounty of three hundred pounds be paid to the person who shall make the first importation to Hamburg before the Dutch or any other nation ; two hundred pounds for the second, and one hundred pounds for the third ; and a bounty of 4s. per barrel on all herrings *properly assorted*, cured by busses and exported to Hamburg up to the 1st of September, when the same should cease. To insure the immediate payment of such bounties, as well as to protect the revenue, the master on arrival at Hamburg to produce his

journal to the British Consul, to show what herrings he has cured, and what quantity of salt he has expended ; and the Consul to forward by post, to the Custom House or Excise Office, from whence the vessel cleared, a certificate showing the quantity of herrings landed and sold at Hamburgh, and the prices obtained for them ; and to deliver a duplicate of such certificate to the master. If thus on his return to port, any defalcation appears, he will forfeit *both his bond and the bounty*. No herrings from busses to be landed or branded in Great Britain—that measure being thus unnecessary ; and the vessel to return from Hamburgh and prosecute the fishing according to the inclination of the master or owner ; and although no bounty shall be paid on herrings so cured and exported, *after the first of September*, yet the master shall not be prohibited from curing herrings as long after that period as he pleases, for the West-India market, or for smoaking, without any bounty, provided that he *assorts* them ; or if cured *unassorted*, that he lands and causes them to be branded, in terms of the regulations.

I would also propose that a handsome premium be paid on the first, second, and third importations to Stettin, Pillau, Dantzig, Riga, and St. Petersburg, provided that the latest of such importations takes place *on or before the first day of August* ; and, from that period up to the first of September, that a bounty of 4s. per barrel be paid on all buss herrings sent to these ports, provided they be *gutted, assorted, laid and packed* in terms of the regulations—but no bounties to be paid on any buss herrings exported to the Baltic after that period.

Although it could not with propriety be enforced, it might be recommended to the owners of busses to keep company, if possible at sea, in parties of five or six, one of which, in the

event of a thin fishing, might act as a jager to Hamburgh for behoof of the whole, and to be paid for doing so by previous agreement, among the whole, at setting out. *No tonnage bounty to be allowed* on any buss or other vessel employed in the British fishery.

As to the coast fishery, by small boats, or that which is carried on by vessels (with or without nets) purchasing fresh herrings from small boats, I would propose that a bounty of two shillings per barrel be paid on all herrings cured in that way provided they are gutted by a knife *within twelve hours* after being taken, *measured with baskets* instead of a kran, properly ASSORTED, in the Dutch manner, and the barrels regularly dated, marked, and branded, to show the assortments. That the practice of gutting herrings with the fingers be strictly prohibited; that *no bounty* be paid on *ungutted herrings*; but, on the contrary, although they may be brought in in that state, roused, or sprinkled with salt, for the purpose of being smoaked, that they shall not be allowed to be pickled or sold in that way, unless branded as "Refuse" and exposed to sale at half price. That no bounty whatever be paid on herrings which are UNASSORTED, and if any are cured in that way they shall be branded by the proper officer as such; neither shall any bounty be paid on herrings cured only with Liverpool, French, or St. Ubes' salt. That the mode of engaging boats, as at present practised by the coopers, be prohibited as highly injurious to the trade: the fishermen ought to take the chance of the market for the fresh fish, and every individual who inclined might freely participate in the fishery: by this means it may be presumed the herrings would be pickled in smaller quantities, and more care and attention would be taken in curing them.

The free importation of salt from Ivica, Lisbon, and Cadiz,

for the use of the fishery should be granted to every individual concerned in it. These salts are essentially necessary to the cure of herrings; and, as it is an object of no great consequence, I think the legislature should at once repeal the present import duty of *3d.* per bushel. This would open a kind of trade for our shipping, and encourage the exportation of cod and ling to the Mediterranean; for the inhabitants of these places will gladly barter salt and other goods for fish.

These salts, being formed by the heat of the sun, are in harder crystals, and, generally speaking, are purer than either Liverpool or Scotch salt, both of which are made by boiling down rapidly, and at a high heat, either brine or sea-water, and it is well known by all who have made comparative experiments that the bay salt is a much more powerful antiseptic, and far better adapted than any other of the above salts for the preservation of fish, especially in a warm climate.

But the grand desideratum in the British fishery is the *Keet Zout* manufactured by the Dutch at Dordt, and with which, as appears from the sketch I have given of their laws, their best herrings are cured. This salt, which is certainly much superior to all others, is made from Mediterranean, bay, and Liverpool rock, salt, by dissolution in sea water, and refining the brine after it is put into a state of evaporation.

This salt, it is stated in some old Dutch tracts I have seen, was discovered by an eminent physician of Cologne, many centuries ago, and was manufactured by him in his native city; this manufacture he bequeathed, at his death, to the senate, for the support of an alms-house; but the Dutch purchased the works from the senate, and entered into a contract to support the alms-house: this contract is mentioned and referred to in the 33rd section of the placard, or ordonnance, passed at the Hague in May, 1651. The Dutch manufac

tured the salt at Cologne for a long period of years, but afterwards erected works of their own at Dordt, where it is now made. The Dutch themselves acknowledge, however, that considerable improvements were made in the manufacture of this salt at the suggestion of their great physician, Boerhaave.*

It is really astonishing that, even to the present day, this salt should be unknown to the British curer. I sent a specimen of it, as a curiosity, to the fishery board at Edinburgh, so far back as August 1818; but no inquiry was made in consequence. In the manufacture of this salt, however, even at Dordt the Dutch labour under a great disadvantage, for the water is there so brackish that they have to employ vessels to go to the North Sea and bring in salt water for boiling; and two ships of this description (denominated the *Zee Scheepen*) may be seen daily passing and re-passing to Dordt. How easily, then, and at how much less expense might not this salt be manufactured on the estates of his grace the Duke of Northumberland, or the most noble the marquis of Stafford? No ships would be there wanted to carry salt water, for their properties are bounded by the German Ocean, and they are in the near neighbourhood of coals which the Dutch must import at a very extravagant rate from England.

As this is the salt with which the Dutch salt their excellent butter and cheese, and apply to all culinary purposes, great advantages would be derived from the manufacture of it in Great Britain, as well for the herring fishery as for our extensive dairies. I hope to be enabled soon to transmit to the Society, for the purpose of being inserted in their transactions, a full and complete account of the manner in which it is manufactured in Holland.

* *NEUCRANZIUS Exercitatio Medica de harengo. Lubeck, 1654, 4to, p. 74.*

That the 'Dutch-cured' herrings, independently of other properties, should possess a different flavour from those of Great Britain or Ireland is not at all astonishing, when we consider the very superior quality of this and other salts with which they are pickled. Indeed it would be ridiculous to suppose that all denominations of herrings, whether fat or poor, in season or out of season, huddled together in the most slovenly manner, and salted with Liverpool or Scotch salt, should be expected to remunerate the importer in a foreign market, in competition with those of Holland.

At one time I made a small importation of this and some other salts, viz. Hamburgh, but paid dearly for my temerity : the salts were shipped by one of the Leith and Hamburgh smacks in large barrels, as being most convenient, but the moment the vessel arrived at Leith she was seized by the revenue officers and the broad arrow placed on the mast. On applying to the Board of Customs, at Edinburgh, however, and explaining, by petition, the purpose for which I had imported it, the seizure was removed and the salt was ordered to be restored, on payment of the duty, and *a fine of five guineas to the seizing officer !*

The seizure was made in terms of some old statutes prohibiting the importation of salt from Germany, *in any other manner than in bulk*, a thing which is impossible by a vessel loaded perhaps with salted hides, oak bark, and other commodities, which would render it useless. It is much to be regretted that old statutes so inapplicable to the present day, and so injurious to the fishery, should be allowed to remain in force, for the British curer is put to trouble and vexation enough with the modern enactments.

That every fish-curer should be obliged to enter a cellar for his salt, and open the same when required, for the inspection

of the revenue officers should the duties on salt be continued, is a measure which cannot well be dispensed with ; but that a poor man should be forced to grant a bond *with two sureties, to a large amount*, appears to me to be unnecessary, and highly detrimental to the improvement of the fishery. Should a fish-curer wilfully and wittingly apply a part of his salt to other purposes than that of curing fish, he is amenable to the court of exchequer, and may be fined to such extent as the circumstances of the case may warrant ; and in default of payment may be committed to prison—but why *deprive* an honest industrious individual of the means of making an effort for the support of his family, in a branch of national trade ? It is very seldom indeed, that any defalcation takes place in a fish-curer's stock—casualties have happened, no doubt, through the admission of rain into their cellars, or fire ; these, however, were accidental, and being satisfactorily accounted for, were passed over ; but allowing that a fish-curer did smuggle a few bushels of salt, and could not pay the fine awarded against him, I apprehend that the injury done to the revenue would be so trifling as hardly to warrant the expense of a prosecution.

I would therefore humbly suggest that the fish-curer's own personal bond, without any surety whatever, should be taken ; and if engaged in the coast fishery, only, that he should be at perfect liberty to weigh his salt over to the excise officer, in the manner before noticed—carry it to any fishing station, at a distance he may find most convenient, and there deposit it in a cellar, or any other situation suitable to his purpose, provided, that on his return, he gives an account of the quantity he has expended ; and in proof thereof, presents to the officer before whom the salt was weighed, the herrings cured therewith, who *shall not brand the same until he is satisfied*

that a fair account has been rendered : and should *any glaring defalcation then appear*, that such officer should be at liberty to *make seizure of the herrings*, so presented for branding ; and cause them to be conveyed to the Custom-house or Excise warehouse, *until the duties on such short coming be paid*, or until the pleasure of the board be communicated to him thereon.

Should this arrangement, however, be deemed too loose and insecure for the revenue, then let large warehouses be built at the expense of government, at all the fishing stations, into which, fish-curers may deposit their salt at their own expense, on delivering to the revenue officer, having charge of such warehouse, the permit or sufferance from the home port, showing the quantity shipped : the curer to pay the same rate of rent as he would have paid for any other warehouse ; and the officer to give him out the salt, by weight, as he may require it ; and when the fishing terminates, a certificate, showing that the whole, or what part has been expended in curing herrings.

I would also propose that all herrings taken, up to the 1st of September, *should be appropriated for the German market*, and home consumption ; and *the later-caught herrings for the West-India market*. This arrangement would prevent a great deal of trouble both to the revenue officers, and to the curers themselves. The Dutch have shown us the example in this respect, for they always did, and always do appropriate the herrings caught and cured after Michaelmas to the colonial market. It is strange that *foul fish* should be preferred for this purpose, but it is really the case ; *if washed clean with, and re-packed in their own pickle, with fresh Keet Zout*, the Dutch assert, that they will keep for twelve months in any climate of the world ; but I imagine if an addition was made

to the pickle, by a mixture of soda with the pyroligneous acid, that the preservation of herrings would be rendered more complete in a tropical climate. I am convinced that this composition, judiciously used, in similar cases, would prevent salted provisions from becoming rancid or rusty.

The Dutch bind their herring barrels with a particular kind of hoop, made from a species of willow unknown in Great Britain. The rind or bark is of a dark brown or red colour, which added to the manner of placing these hoops, distinguishes a Dutch herring barrel from that of all other nations; and the Hollanders are so sensible of this, that although they export vast quantities of hoops to Great Britain, *a single red hoop will never be found among them.* The exportation of this article is carefully and strictly prohibited. The British bind their barrels with very indifferent hazel and willow hoops, placing, generally, three at the top, three about six inches below these, and ten at the bottom; and as the barrel is nearly cylindrical, the whole weight and stress rests, when rolled, *on the staves*, which frequently causes the pickle to escape. But the Dutch place four hoops at the top, four at the bottom, and four on each side of the bung hole, *on which the whole weight of the barrel rests*; and as the Dutch barrel is wider at the bulge than the British, it can be rolled with more safety, as the staves never touch the ground. As these hoops are far superior, in every respect, to any species of hoop to which the British curer has access, it would be of consequence to procure plants of this willow from Holland, which might be reared and propagated at a very trifling expense, in the highlands of Scotland, and in the near neighbourhood of our principal fishing stations.

To obtain and establish a preference for British cured herrings in Hamburgh, and the Baltic ports, is the first and

grand object to which the aid and interposition of the legislature ought to be directed. It would not only place the trade, exclusively, in our own hands ; but the herrings cured *on the coast*, would be purchased by our colonists at such a price as would fairly remunerate the individuals who embark in the coast fishery.

It is the Hamburg market *which always regulates the home market* ; and if we allow it to be pre-occupied and monopolized by foreigners, we certainly cannot expect any other result than we have experienced. But a preference once obtained and maintained there, would place the British white herring fishery on a sure and solid basis ; and, in place of being what it now is, a burthen on the nation and the ruin of individuals, it would become a lucrative and gainful trade, a spur and incentive to industry, and a nursery of the most active and hardy seamen in the world.

No man who has the interest of his country at heart, can behold with unconcern, the annihilation of our deep-sea fishing ; or, if I may be allowed the expression, the transfer of our birth right to a rival nation ; and see our herring-fishery, in spite of all the money that has been expended for its protection, sink to that degree of insignificance, as to be carried on by a few small boats, creeping about, as it were, in our creeks, harbours, and bays. While the offing presents to the eye a well-manned fleet of foreigners, under a crowd of sail, carrying off the richer herrings of the deep, for the supply of a market which we could at all times reach and fill before them ! May not the question be asked—are government aware of the state of our fishery ?—Is the navy of Great Britain to be manned from a fleet of cobblers ; or, is it policy to expend so much of the public money in bounties for

quantities of ill-cured, unassorted herrings, unfit for any market save that of the colonies?

Several causes might be assigned for the decrease in the demand for pickled herrings, compared to what it was many years ago; and although the Dutch impute the falling-off of their fishery to the immense quantities of herrings cured by the Swedes and Norwegians, still the whole quantity caught, at present, by all the European nations, is greatly below what it was about seventy or eighty years ago.

Notwithstanding the great advantage which the late war afforded to the British, to the Norwegians, and the Swedes, particularly from the year 1805, to the year 1813, when Holland groaned under the tyranny of Napoleon, and when their busses, if they ventured to sea, were captured and destroyed by our cruizers, the Hollanders have been gradually extending their fishery; and, if I am correctly informed, upwards of fifty new busses will this year be added to their fleet. And although the quantity cured by them, since the emancipation of their country, may be inferior to that of Great Britain, still *it is a prosperous and increasing trade*, and of general benefit to Holland: for while our salted herrings are merely consumed by the poorer classes on the continent, and by the negroes in the West Indies, Dutch herrings continue a favourite dish and a luxury at the tables of the great. They are exported to the Cape of Good Hope, at a great expense; and, notwithstanding of a duty amounting almost to a prohibition, are actually imported into the Metropolis of Great Britain.

Of the open-sea fishing, as it is called, or that which is carried on by vessels with nets, salt, and barrels, and who sometimes fish, and sometimes purchase fish from the small

boats, as before described, very little benefit can be expected to result either to individuals or to the nation, unless this species of fishing, like that of the coast fishery, is to be appropriated solely to the supply of the colonial market ; and I cannot do better in concluding this paper, than quote the remarks of an intelligent commentator whose labours and suggestions for the improvement of the fishery, and other branches of manufacture, have been of essential service to the country.

In speaking of the Minch, where I maintain the best herrings are to be found, he says, “ I had occasion to be on the great Minch at several different times, from about the middle of June until towards the end of September, and had ocular evidence that the whole of that extensive sea was crowded with herrings *of the best quality*. On one occasion when the sea was calm and smooth, I saw vast numbers of herrings passing the vessel ; and was told that the crews of different vessels, then riding on the Minch, actually caught considerable quantities *with hand nets* constructed on purpose. When I was coming away, I had occasion to traverse a considerable part of this sea, and was becalmed upon it during a very dark night. The sea, as usual, shone at the surface when agitated by a stick, or point of an oar ; but what struck me most was, an immense number of glancing lights all around the vessel, without any apparent agitation of the sea. The people on board, all assured me that these lights were caused by herrings ; and that they often exhibited such lights in dark nights.

“ From these facts, I was led to infer, that the whole of that extensive sea was swarming with herrings, during this long period. Indeed I was not singular in drawing this conclusion ; but found it strengthened and confirmed by the

opinion of the various crews who conveyed me in their boats, and by those with whom I conversed, all of whom are expert fishers, and were anxiously expecting the entrance of the herrings into a loch where they might be able to catch them. Why they did not come in, is one of those secrets respecting the natural history of herrings which human genius has not yet developed. But had only *one-half* of the busses (open-sea vessels as they are called), *which were loitering in the different lochs doing nothing*, been employed in the Dutch mode of fishing, in the deep sea, they might have caught herrings sufficient to have fed the inhabitants of the whole British Isles.

“The different premiums given by government, *have already operated their full effect*, in making the highlanders tolerably expert in catching herrings in lochs; and were some mode devised for allowing *the use of salt free from revenue bonds, and other perplexing formalities*, without injuring the revenue, perhaps these bounties might now be safely diminished, if not withdrawn.

“The result of the preceding statement is, that it highly concerns the interest of this country, that the Dutch mode of catching and curing herrings in the deep sea should be recommended and stimulated by bounties and otherways, *cost the attempt what it may*. It is probable a sufficient number of Dutch fishers might be found to embark in our vessels, to teach our men their mode of catching and curing herrings. To these, besides the wages that might be agreed upon, and paid by the individual adventurers, government should allow a small premium on every barrel of herrings caught, and *properly cured*. This would stimulate their exertions, and might be a separate bounty from that given to the adventurers

themselves who equip the vessel. After our people are fully masters of this mode of fishing, the bounties may be gradually diminished, and, at last, withdrawn.

“ The advantages of this measure would be a great increase in the number of our seamen, and a vast store of highly nutritive food added to the subsistence of our people. It may be observed, that in these northern seas, even in seasons when the herrings come into lochs in the greatest abundance, they are always roaming about in the open sea, *from one to three, sometimes four months*, before they enter any loch. At this period, and even when they happen to enter early into a loch, they are commonly *too fat for exportation to the warm climates*: but they are easily cured *for home consumption*, and are *delicate in their flavour, and nutritious* beyond what people on the eastern coasts can form any idea of. Their motive for coming into the lochs is to deposit their spawn, and then they are full of roes, lean, and are *neither so palatable nor nutritious*. But in this state they keep best in warm climates.

“ By adopting the deep-sea fishing, *one or more months would be gained*, when the quality of the fish is in the highest perfection *for home consumption*. When they go into lochs there is nothing to hinder these vessels to follow them and to continue their operations as long as the herrings are worth catching. Our present mode is extremely imperfect and uncertain. Often vast shoals come into lochs, where there are neither vessels, salt, nor casks. The rumour of this seduces adventurers to make great exertions the ensuing year, when, perhaps, few or no herrings are to be got in the lochs. This is attended with much loss to individuals, and operates as a discouragement to the fishery in general.”

In narrating my own proceedings—in the natural history

of the herring—in sketching the laws of Holland and Great Britain—in remarking thereon, and offering hints and suggestions for improvement, a minuteness which, perhaps, may sometimes be deemed tedious, has been observed; but in a subject of so much importance, and in which so many abuses remain to be eradicated, general observations would have been incompatible with accuracy.

I am, Sir,

To *A. Aikin, Esq.*

&c. &c. &c.

Sec. &c. &c.

J. F. DENOVAN.

SIR;

Aberdour, Fife, 28 December, 1822.

IN April last I had the honour of transmitting you an essay on the herring-fishery, which I lately learned from my friend Howard had been referred by a committee to the next session of the Society; and that the sixteen gallon barrel of herrings, which I forwarded in December 1821, had been kept as a specimen.

Owing to the circumstance of my brother's indisposition my movements in the herring-fishery this year were unavoidably much abbreviated. But although the scale was limited, fortune has again crowned my endeavours with success. The first six barrels I exported, and which were consigned to the house of Mr. Jurgen Bona Meyer, reached Hamburg in the *morning*, and the *first* Dutch jager in the *evening*. Thus I claim the victory. I got sixty-five dollars a barrel for my first herrings, being five dollars per barrel more than I ever obtained in that market.

The summer, in the north-west of Scotland, during the months of June and July was uncommonly warm and dry,

and consequently few or no herrings were to be taken; and this will always be the case in the absence of rain for the reasons stated in my essay. I could, therefore, only manage to send twelve barrels more to the German market, which owing to calm weather and contrary winds, did not reach their destination until the beginning of August. By the accompt sales transmitted from Hamburg they were sold on the 6th of August, and when common British herrings which had previously reached that market could hardly be sold at from 17 to 25, my herrings brought from 60 to 90 marks currency, affording the most satisfactory proof of their superiority to those of Scotch *unassorted* herrings, which, as I have explained in my essay, come under the denomination only of *wrack* or refusal, as well in Holland as in Hamburg.

As my herrings are now greatly in demand in Edinburgh and other towns in Scotland, I cured thirty-six barrels more, which were afterwards put up in small kegs and sent to my agents at these places. They leave a very good profit in this way, and appear to give great satisfaction to the public.

As however the herrings contained in the sixteen gallon barrel forwarded as a specimen to the Society in December last, cannot, at this distance of time be expected to be in the best order, I have felt it a duty as well to the Society as myself, to send a sixteen gallon barrel containing a fair specimen of *assorted* herrings of this year's taking. They are not of the early *maatje* species, but such as I cured in July, when at full maturity, and which are denominated by the Dutch *zuiver vollen haring*, sound, full-sized herrings.

I have also the honour of transmitting you in illustration of my essay, and in corroboration of what I advanced as to the food of herrings, three vials put up in a small box, marked Nos. 1, 2 and 3. No. 1 exhibits the contents of a herring's

stomach, taken and opened on the 4th of July last. On cutting up the herring the stomach seemed much distended; and on opening it with a lancet there appeared a dense mass, like a piece of roe, full of black spots; this I threw into spirit of wine, which showed a quantity of half-digested shell-fish fry; they may readily enough be seen with the naked eye, but appear quite distinct when laid on paper and viewed with a magnifier. I thought it as well not to filter or renew the spirit, so that the whole contents, including the gastric juice, might remain as entire as possible.

No. 2, contains the entire gut of a herring; the stomach enormously distended with the fry of shell-fish; two counter-openings, with black bristles inserted, show them distinctly; the vermicular substance suspended by the cotton thread is the roe.

No. 3 contains the stomachs of five herrings cleared of the fat, &c. From their pellucid state, before immersion in spirits, I could perceive in the largest three or four, and in another one or two young prawns. The remaining three contained nothing but the oleaginous milky fluid usually found in the stomachs of fish, and which has induced a general belief that they subsist by suction of some attenuated aliment, or invisible animalculæ, which the water affords. In short, No. 3, shows the ordinary state of contraction, while No. 2, by exhibiting the extent of distension of the stomach, affords the most unequivocal proof of the voracity of the fish, when within reach of their prey, and of the food they devour.

Some of the herrings caught in the beginning of July were extremely rich, and yielded half an ounce of limpid oil, on being subjected to heat. I have no doubt that this oil, which is of a superior quality, might, on being refined, be found useful for many purposes. The sixteen gallon barrel and

box are addressed to the care of William Vaughan, Esq. Mincing-lane, for the Society, and I hope will reach their destination in safety. I have the honor to be, very respectfully,

Sir,

To A. Aikin, Esq.

&c. &c. &c.

Sec., &c. &c.

J. F. DENOVAN.

N° II.

WINE FROM NEW SOUTH WALES.

The LARGE SILVER MEDAL was this Session presented to Mr. GREGORY BLAXLAND, for Wine the produce of his Vineyard in the Colony of New South Wales.

It appears from the Custom-house and other documents that $\frac{1}{4}$ of a pipe of red wine was in March, 1822, shipped from Sydney in New South Wales. This wine, the property of Mr. Blaxland, was made by him from grapes the produce of his vineyard at Paramatta. About 10 per cent of brandy had been added to it in order to enable it to bear the voyage.

On examination by the committee it appeared to be a light but sound wine with much of the odour and flavour of ordinary claret, or rather holding an intermediate place between that wine and the red wine of Nice. The general opinion seemed to be, that although the present sample, from the inexpertness of the manufacturer and the youth of the vine, is

ERRATA.

Page 134, line 4, for "rested," read rolled.

— — — 14, *for "acting," read action.*

—136, — 18, *for "opposition," read apposition.*

—137, — 1, *for "rested," read rolled.*

—140, — 10, *for "observation," read observations.*

—141, — 30, *for "these," read their.*

—144, — 13, *for "opposition," read apposition.*

—155, — 6, *cancel "and the brass plate B."*

—178, — 3 *from bottom, for "Hawes," read Howes.*

—230 (*note*) *last line, for "§ 28," read § 29.*

—298, *before "Henry Goodwyn," insert,*

T. GILL.

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